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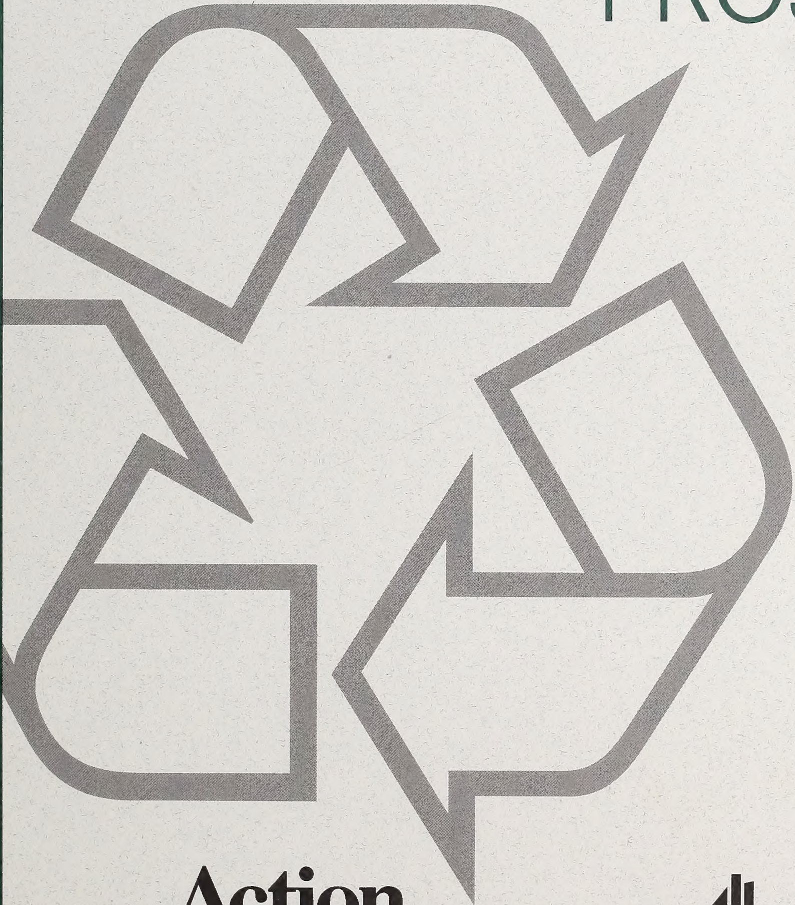
Compendium of ALBERTA BUSINESS WASTE MINIMIZATION PROJECTS



Action on WASTE

Alberta
ENVIRONMENTAL PROTECTION

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Introduction

Purpose of the Compendium

There are many businesses in Alberta operating successful waste minimization projects. Many of these businesses are achieving financial benefits through more efficient use of raw materials, reduced waste disposal costs and revenues from the sale of recyclable materials. Other businesses may not achieve financial benefits, but see waste minimization as part of good corporate citizenship.

These successful business waste minimization projects can serve as models for other businesses planning similar initiatives. The purpose of this Compendium is to describe the planning process and current operations of several business waste minimization projects in the province. It is hoped that the Compendium will encourage and guide other businesses considering waste minimization projects.

The selected projects represent a range of waste minimization alternatives and business types. The projects cover a range of businesses in terms of size, business sector, geographic location and degrees of success. While much can be learned from successful projects, some of the difficulties encountered in developing these projects can also offer important lessons.

An initial list of businesses to be considered for inclusion in the Compendium was developed by contacting industry associations, waste management organizations, federal and provincial government departments and managers of municipal waste minimization programs. Businesses were selected from this initial list which had successful waste minimization projects and which represented a range of business sectors.

The selected businesses were contacted by telephone to solicit their cooperation in gathering information for the Compendium. Business owners, managers and operators were interviewed during an on-site visit to the business conducted during January or February 1995. Some follow up contact was made by telephone or letter to clarify information or to gather additional information.

In all cases, business owners, managers, operators and employees were very helpful in providing information regarding their projects while respecting corporate policies regarding confidentiality. Many provided detailed information packages regarding their project history, costs and results. The cooperation and assistance of all of the businesses included in the Compendium are gratefully acknowledged.

Every effort has been made to ensure the reliability and accuracy of the information in this Compendium. However, as waste quantities were not always measured and tracked by the participants, some of the information provided is based on estimates made during brief site visits or estimates made by the participants themselves. Readers are encouraged to carefully study their own situation before applying the ideas presented in this Compendium.

Organization of the Compendium

The order in which the projects are presented in this Compendium is based on the hierarchy of the 4 R's: Reduce, Reuse, Recycle and Recover. However, this is a rough guideline only as many projects contain elements of more than one of the 4 R's.

The information for each business is organized into Business Background, Project History and Project Description. Information boxes have been used to highlight the Project Summary, Project Costs and Project Results for each business.

Additional Information

Section 3 of the Compendium, **Information Sources**, includes listings of organizations and publications which can provide additional information on business waste minimization opportunities.

Additional information regarding any of the projects included in the Compendium and additional information regarding business waste minimization opportunities may also be obtained by contacting:

Action on Waste
Alberta Environmental Protection
(403) 427-5838 (Edmonton)
(403) 287-8255 (Calgary)
1-800-463-6326

Reducing Solvent and Water Use

Barrhead Cleaners, Barrhead

Project Summary

Business Background: Barrhead Cleaners is a drycleaning business with three employees located in Barrhead, 115 kilometres northwest of Edmonton.

Project Description: Barrhead Cleaners installed a new dry-to-dry, no-vent, refrigerated drycleaning machine to reduce solvent use and hazardous waste. They also installed a storage tank to permit reuse of drycleaning coolant water in a new washing machine.

New microprocessor-controlled drycleaning machine has reduced solvent use by 60%.

Business Background

Barrhead Cleaners is a drycleaning business located in Barrhead, approximately 115 kilometres northwest of Edmonton. The business has three full-time employees. Barrhead Cleaners also operates depots in Swan Hills and Mayerthorpe where clothes are dropped off and taken to the Barrhead facility for cleaning.

Project History

In 1987, Barrhead Cleaners came under new management. The new owner/manager had a strong interest in making the business more environmentally friendly. Because of this interest, the manager looked for opportunities to reduce wastes and improve operating efficiency.

When new equipment was required, the manager took the opportunity to research equipment alternatives and to make changes which resulted in waste reduction. The manager made use of trade journals and industry association meetings to find environmentally friendly alternatives.

Project Description

In 1991, Barrhead Cleaners replaced their existing drycleaning machine with a new state-of-the-art machine. The previous drycleaning machine had manual controls and involved a manual transfer of wet clothes to the drying unit. During this transfer, there was some loss of the drycleaning solvent, perchloroethylene, through evaporation.

The new drycleaning machine is a dry-to-dry, no-vent, refrigerated machine. The clothes remain in the same drum in the machine from the time they are placed in the machine until they are dry and ready to be removed. This has reduced the loss of solvent through evaporation which occurred with the manual transfer of clothes. Also, the new machine has microprocessor controls which provide more efficient drycleaning than the previous manual controls.

Within drycleaning machines, the dirty perchloroethylene is regenerated through distillation, resulting in clean, reusable solvent and a contaminated sludge. The new drycleaning machine has a more efficient distillation/refrigeration unit which results in better solvent recovery.

Since installing the new drycleaning machine, solvent use has been reduced by 60% from 1600 litres per year to approximately 650 litres per year. The more efficient solvent recovery unit has also resulted in a reduction in the amount of sludge which must be disposed of as hazardous waste. Also, because there is less loss of solvent through evaporation and leakage

Project Costs

Capital Costs: *$50,000 for new drycleaning machine; $260 for water storage tank and piping.*

Annual Operating Costs: *No increase in annual operating costs.*

Revenues & Savings: *$4,400 per year savings in solvent purchases and hazardous waste disposal costs; $800 per year savings in water costs. Also, $438 per year savings in hanger costs by encouraging return and reuse.*

with the new machine, airborne emissions of solvent have been reduced from 40 parts per million to 11 parts per million, resulting in a safer work environment for company employees.

The cost of the new drycleaning machine was $50,000. The new machine has resulted in savings of $4,400 per year including $3,200 savings in solvent purchases and $1,200 savings in hazardous waste disposal costs.

Barrhead Cleaners has also installed a new 65lb (30kg) washing machine in addition to an existing 20lb (9kg) washing machine. However, when considering the purchase of the new, larger machine, the manager discovered that a new town water line into the premises would be required to service both machines. The installation of this line was an expensive alternative.

At the same time, the manager was aware that the coolant water from the drycleaning machine, which was clean water, was being sent directly to the town sewer. Seeing an opportunity, the manager installed a 135-litre storage tank in the rafters above the new washing machine. The coolant water from the drycleaning machine is now directed into the storage tank and is used as wash water in the washing machine. The water now has two uses before reaching the town sewer.

When installing the system, some modifications had to be made to the fill valves and flow lines to the washing machine as the 135-litre gravity-feed storage tank did not provide as much water pressure as a direct connection to the town water line. However, these modifications were minor.

The cost of installing the storage tank and piping was $260. The change reduced water consumption by 1,010,000 litres per year and reduced water costs by $800 per year.

The installation of the larger washing machine allows Barrhead Cleaners to launder rather than dryclean more materials, for example, industrial coveralls. This results is less use of drycleaning solvent and less hazardous waste. Barrhead Cleaners is encouraging more of its commercial clients to switch to reusable items such as linen towels rather than paper towels. This is not only good for the cleaning business, but reduces waste at the customer's place of business as well.

Barrhead Cleaners has taken steps to reuse and recycle other materials in their business. Customers are encouraged to return hangers to the store and these are reused to hang industrial cleaning such as coveralls. This eliminates the purchase of 7,200 hangers and saves $438 each year. Barrhead Cleaners also accepts plastic garment bags from customers and delivers these to the community recycling program. Other plastic bags, which customers use to bring their clothes to the store, are reused as garbage bags. Within the store, the employees make efforts to further reduce wastes by using glass coffee mugs and reusable coffee filters.

Barrhead Cleaners also participates in a coat recycling program which provides used winter coats to needy children at no cost. In 1994, 305 coats were cleaned and distributed to the community with the financial assistance of the Barrhead Kinsmen Club, Agricultural Society, Lions Club, Rotary Club and Legion.

Project Results

Barrhead Cleaners reduced drycleaning solvent purchases from 1,600 litres per year to 650 litres per year. This also resulted in a 60% reduction in the amount of sludge disposed of as hazardous waste. Over one million litres of water per year were saved through reuse. Return and reuse of hangers eliminates the purchase of 7,200 hangers each year.

Reducing Delicatessen Wastes

The Bagel Tree Delicatessen, Edmonton

Project Summary

Business Background: The Bagel Tree Deli is a small restaurant business, located in the Old Strathcona district of Edmonton, which has been operating since 1989. It employs 14 people and includes take-out service and seating for 35 customers.

Project Description: The Bagel Tree has implemented several practices to reduce wastes. In addition, they recycle paper, corrugated cardboard, plastic, milk cartons, glass, food cans and beverage containers. Business neighbours have been encouraged to implement waste minimization programs. Contests and incentives have been used to both educate customers and encourage their participation in waste reduction.

Business Background

The Bagel Tree Delicatessen is a small, owner-operated restaurant and delicatessen, located in the Old Strathcona district of Edmonton, which has been operating since 1989. It employs 14 people and includes take home food sales and seating for 35 customers. The business is located on a busy traffic artery in an older commercial district with a variety of small retail businesses. The Bagel Tree serves both visitors to the surrounding commercial area, as well as the local residential community, and has a number of regular customers. The business expanded and moved across the street into a larger space about one year ago.

Project History

Since opening, the Bagel Tree has been committed to developing a waste minimization program which includes purchasing changes, reducing product packaging, recycling, composting and promoting responsible waste management in the local residential and business community. When the Bagel Tree began their waste minimization efforts in 1989, the problem of diminishing landfill space in Edmonton fuelled their interest in reducing their business waste. In starting up the waste minimization program, the owners also felt that it was important to involve their customers and their business neighbours.

When the program was initiated, information about business waste minimization options was not readily available and there were no commercial incentive programs. Telephone inquiries were made to a variety of agencies and, recognizing the importance of compostables in their waste stream, one of the partners in the business took a course in composting. As potential waste reduction options were discovered, they were integrated into the daily activities of the business. Later, when the Bagel Tree's waste reduction program became established, they participated in the City of Edmonton's waste reduction audit program.

The Bagel Tree recognized that customer acceptance and participation were essential. Customer education became a major part of planning and implementing the waste minimization program. This education took the form of informative, hand drawn window displays which explained the restaurant's environmental policies. As well, over the counter conversation was used to communicate the importance of waste reduction and to gently encourage support for the Bagel Tree's practices.

Customers were also offered incentives to participate directly in waste reduction by becoming eligible to win a free lunch if they agreed to take less packaging with their purchases. At one time, this incentive led to about 90% customer participation. At present, the restaurant's approach to waste is well accepted by their regular customers and such incentives are not necessary.

The Bagel Tree also encouraged their customers to discuss issues, such as unnecessary packaging, with other businesses and met directly with local businesses to share their waste minimization knowledge. The customer education and business awareness efforts fell in line with the Bagel Tree's "ABC" theme, changing the Attitude of Business and Community.

In the early stages, the owners spent a significant amount of their personal time planning the education posters and contests, and researching alternative products and practices. This occurred at a time when information was sparse and practices, such as offering reusable bags, were largely unknown in retail markets. Now that waste reduction has been successfully incorporated into their business, the workload has been significantly reduced.

The deli has reaped significant public relations benefits for their efforts. They have been the subject of a variety of newspaper and environmental newsletter articles as well as participating in a radio interview. They have received recognition from the City of Edmonton for their efforts and received an Emerald Award from the Province of Alberta in 1993.

Project Description

The Bagel Tree operates in approximately 186 square metres of space in a long, narrow floor plan. This space includes customer tables, counter space, display cases, behind the counter work space, kitchen, hall and storage room.

Collection and separation of recyclables form a major part of their waste minimization program. To facilitate this, the kitchen area has a large plastic garbage can into which recyclables, other than papers, are placed. These include plastic, milk cartons, glass, metal food cans, and beverage containers. Corrugated cardboard is flattened and taken directly to a 3-cubic metre bin beside the waste bin in the alley. Mixed papers, newspaper and boxboard are collected in a separate container located in the small office area which occupies the rear of the kitchen. A 175-litre plastic bin for recyclables is also located in the customer service area.

The Bagel Tree Delicatessen's waste minimization program is as easy as ABC: changing the "Attitudes of Business and Community".

When staff have time, recyclables are taken from the kitchen and customer areas to the storage area where materials are sorted into a number of separate 40-litre bins for each material. These smaller bins are washable plastic stacking bins commonly available at hardware or home improvement centres.

When these bins are full, recyclables which have no cash value are stored outside the rear door of the deli. All recyclables are collected once per week by a staff member who, incidentally, operates a small recycling collection service in the area. The small bins stack neatly in the back of a pickup truck and are transported to a local community drop off centre. Permission to drop materials at the community site has been obtained providing the materials are well sorted and clean.

While recycling is a large part of the waste minimization program, there are other waste reduction and reuse practices which are applied at the Bagel Tree. These practices include:

- switching from paper towels to washable linen;
- changing from individual packets to refillable containers for creamer, salt, and pepper;
- reducing polystyrene take-out packages by offering reusable alternatives;
- returning egg cartons and onion bags to the farmers market for reuse by vendors;
- offering surplus glass and plastic jars to customers;
- offering coffee at a reduced price if customers bring their own cups;
- giving customers minimum packaging options for their purchases and asking if they need a bag to carry purchases;
- switching to environmentally friendly cleaning products and making their own cleaners;

- offering locally made cloth lunch and tote bags for sale at cost;
- offering reusable plastic food containers for sale at cost;
- switching from tetra packs to recyclable glass bottles for juices;
- using recycled envelopes and stationery stamped with the supplier's address to assist others in locating a source of similar products;
- using both sides of all papers and envelopes for notepaper before recycling them;
- purchasing reusable containers to transport baked goods to client businesses; and
- offering reusable tableware to catering customers.

In addition to these practices, the Bagel Tree once segregated compostable material which was taken by their staff to backyard composters. As the business grew and moved to a larger location, the volume of material increased and staff time decreased with the result that the compost program was discontinued. It will be reestablished when a centralized composting service is found which can handle the volume of material generated.

While it takes some time to sort recyclables and offer gentle persuasion to customers who are new to the business, all of the waste minimization activities are accepted by staff. Staff are made aware of the waste minimization program through on-the-job instruction and notes in the staff handbook. The owners are reluctant to call their waste minimization efforts a "program" since the practices are well integrated with the daily business routine.

Project Costs

Capital Costs: *Less than $100 for small plastic bins.*

Annual Operating Costs: *$450 per year for recycling service.*

Revenues & Savings:
Unspecified savings in purchased materials.

Minor problems include the potential for neighbours to be upset at the stack of recyclables outside the back door in a busy alley. It is expected that this problem will be diminished as these materials gradually become perceived as resources rather than wastes. Storage of recyclables is a minor inconvenience due to the confined space in which the deli operates but this is accepted as part of the strong commitment by owners and staff to the waste reduction program.

Since it is motivated primarily by a desire to be environmentally responsible, the Bagel Tree does not keep detailed records of their waste minimization program. However, the owners believe that the waste minimization program costs more than it generates. The collection of recyclables costs $37.50 per month and the recyclables are returned to a community drop-off where no revenue is received. In addition, products offered to customers to reduce waste are costing more and are being sold for a reduced profit margin.

One area of cost saving is from reduced purchases of supplies such as bags and other packaging for customers. Operating costs for the recycling program have recently been reduced slightly since the currently high prices for used cardboard have resulted in the collection charge being dropped.

The Bagel Tree's waste bin is shared with other businesses and the reduced waste generation at the Bagel Tree has not resulted in lower costs for waste disposal. However, the Bagel Tree did benefit from moving to a location where the waste bin costs were shared by a number of businesses. This sharing of costs resulted in reducing their waste disposal costs from $90 per month to $60.

The program has reduced overall waste generation by 75%. Only two small bags of waste are currently generated each day. When a new composting option is found, it is expected that this can be reduced to a single bag per day, a level achieved when the composting program was in operation. Customer demand for bags and other packaging has also been reduced by 60%, with the result that customers are generating less waste as well.

Project Results

The Bagel Tree has reduced the quantity of waste generated by 75% to only two small bags of waste per day. Customer demand for bags and other packaging has also been reduced by 60%.

Reducing Home Construction Wastes

Challenger Homes, Edmonton

Project Summary

Business Background: Challenger Homes is an Edmonton home builder, constructing approximately 70 homes each year. Challenger Homes has been innovative in the use of energy efficiency technology in new homes and built Canada's first EnviroHome.

Project Description: Challenger Homes is a member of Partners In Clean Construction, an organization involving a developer, builders and other agencies, which operates a construction waste minimization program in an Edmonton subdivision. Challenger Homes also practised waste minimization techniques and used recycled materials in the construction of the EnviroHome in 1994.

Business Background

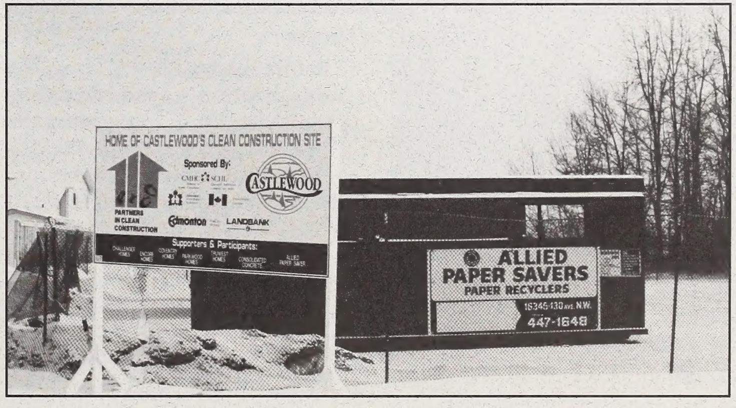
Challenger Homes is an Edmonton home builder that has been in business since 1990, although the management of Challenger Homes has over 30 years of experience in related home building companies. Challenger Homes builds approximately 70 homes in the Edmonton area each year.

Project History

Challenger Homes has a history of innovation in environmentally-friendly housing construction. A related company built the first R-2000 energy efficient home in Alberta in 1983. Since that time, Challenger Homes has been a leader in the use of energy efficient technology, such as heat exchange systems, in new home construction.

In 1992, the Canada Mortgage and Housing Corporation (CMHC), the Greater Edmonton Home Builders' Association (GEHBA) and the City of Edmonton cooperated in a waste audit of new home construction. They measured the waste produced from the construction of four homes in the Castlewood subdivision in north Edmonton. The audit results showed an average of 3,104 kilograms of solid waste produced per house. Significant waste materials during construction were dimensional lumber, drywall, plywood, oriented strand board (OSB) and corrugated cardboard.

Following this initial audit, CMHC and the City of Edmonton worked with the builders and tradespeople to make them aware of the amount of waste generated and the opportunities for waste minimization through simple waste reduction and reuse techniques. The education program stressed a "think twice, cut once" approach. An audit on a second set of four houses, constructed after the education program, showed an average decrease of 811 kilograms of waste per house, or 26% less waste through waste reduction and reuse. An additional 835 kilograms of wastes per house were recycled. The total decrease in wastes going to landfill was 1,648 kilograms per house or 53%.


HOME OF CASTLEWOOD'S CLEAN CONSTRUCTION SITE
Sponsored By:
CASTLEWOOD
PARTNERS IN CLEAN CONSTRUCTION
Edmonton
LANDBANK
Supporters & Participants:
ALLIED PAPER SAVERS
PAPER RECYCLERS
447-1648

Materials are collected for recycling at the Partners In Clean Construction site in the Ponds of Castlewood subdivision.

To implement the results of this pilot project on a wider scale, CMHC, GEHBA, the City of Edmonton, Environment Canada, a developer and five home builders, including Challenger Homes, formed Partners In Clean Construction (PICC). PICC is implementing a waste management program in the Ponds of Castlewood subdivision.

The objectives of the PICC waste management program are:

- to introduce the reduction and reuse strategies learned during the 1992 audit into a subdivision and to realize a 20% reduction in waste over a one-year period through reduction and reuse;
- to test a depot system for on-site collecting of wastes for recycling and to find recyclers for the main categories of construction waste;
- to demonstrate the advantages and importance of waste management to sub-trades, builders and developers; and
- to make the project results available to other local home builder associations and members of the building industry.

The PICC waste management project at the Ponds of Castlewood began in January, 1995.

Project Description

Waste reduction at the Ponds of Castlewood began with the developer. Prior to the construction of a storm water retention pond in the subdivision, the developer removed and set aside much of the native vegetation from the site. This vegetation normally would have been destroyed or removed from the site during the construction. However, the developer used the retained native vegetation to re-naturalize the site after pond construction was complete. As a result, less nursery stock was required to be brought on site to revegetate the area.

No natural materials were removed from the site during pond construction. All tree trunks and other woody materials which were not used in the revegetation were chipped on site and used as mulches, while other organic materials were composted.

Edmonton Construction Waste Audit Results

Average waste collected per house in kilograms

Waste Type	Before waste minimization program	After waste minimization program
Dimensional lumber	1085	575
Drywall	688	675
Plywood/Oriented strand board	478	433
Corrugated cardboard	429	271
Shingles	190	160
Plastics	103	63
Metals	96	83
Miscellaneous	35	33
Total	**3104**	**2293**

Project Costs

Capital Costs: *Capital costs for PICC program not specified.*

Annual Operating Costs: *PICC program began in January, 1995. Annual operating costs not available at time of writing.*

Revenues & Savings: *No revenues are received for the recycled materials at this time. Future potential savings in material purchases and waste disposal costs are anticipated.*

PICC has provided the home building partners in the project with educational materials on waste reduction and recycling. The materials cover waste minimization ideas for use at the design and planning, estimating and material purchasing, and construction stages. The materials also include information cards for many of the sub-trades, as well as information on the operation of the recycling depot at the Ponds of Castlewood.

The recycling depot at the Ponds of Castlewood consists of five 30-cubic metre bins in a 30 metre by 30 metre fenced compound. There is one recycling bin for each of the following material groups: clean drywall; dimensional lumber; plywood, OSB and medium density fibreboard (MDF); and corrugated cardboard, boxboard and shingle wrap. The fifth bin is used for collecting wastes including shingles, insulation, metals, plastic, treated lumber and other materials.

All builders and sub-trades working in the subdivision are responsible for bringing their materials to the depot and for sorting the materials into the correct bins. A part-time Waste Management Supervisor monitors the site and provides assistance in determining the correct bin for each material. The Supervisor has been hired using funds from Environment Canada's Environmental Partners Fund.

Three of the bins at the depot are rented from a recycling broker and PICC pays to have the bins emptied each time. The bins for drywall and paper products were purchased by PICC. The drywall is sent to a building products manufacturer for recycling and the paper products are sent to a local manufacturer of cellulose insulation. The wood products are currently being stockpiled until a market can be confirmed. If no market is found, the wood will be chipped and used as landscape mulch.

The program does not currently receive any revenue for the recycled materials. However, the program is supported by an Environmental Partners Fund grant and the participants anticipate that they will achieve some savings through reduced waste disposal costs and reduced costs to clean up sites following construction.

As the PICC program was in its first month of operation at the time of writing, no quantitative results were available. However, the participants do not anticipate any difficulties in reaching their goal of a 20% reduction in wastes. Sub-trade cooperation has been excellent with over 98% of the materials sorted correctly.

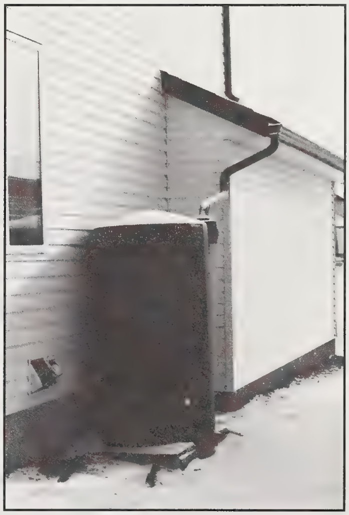
Challenger Homes was a natural partner in the Partners in Clean Construction program because of their experience in environmentally-friendly home construction. In 1994, Challenger Homes was selected in a national competition to build Canada's first EnviroHome. The EnviroHome is a project sponsored by the Canadian Home Builders Association and Canada Trust to demonstrate energy efficient, environmentally-friendly home construction.

The EnviroHome objectives included the demonstration of the use of technology for energy efficiency and air quality, the use of recycled materials in construction and the minimization of waste during construction. The EnviroHome had to meet Natural Resources Canada R-2000 energy efficiency standards and incorporate CMHC's Healthy Housing features including high quality indoor air, efficient use of resources and affordability.

Challenger Homes began the construction of the 161-square metre, storey-and-a-half EnviroHome in the Castlewood subdivision in April, 1994. The home was opened to the public in September, 1994.

Several waste reduction techniques were used during the construction of the EnviroHome. Excess vinyl siding pieces were ground on site and mixed with the base material used below the concrete basement floor and garage floor. Excess drywall was broken up and placed in interior walls. Much of the corrugated cardboard received on site was sent back to suppliers.

Challenger Homes used "ecoscaping" to reduce landscaping wastes. The landscaping was designed with extensive garden and mulched areas, and with less lawn area. This will reduce the use of water and fertilizer in lawn maintenance. Drought resistant and native plants were used in the landscaping. Excess dimensional lumber was chipped on-site and the chips were used as mulches. Rainwater and snowmelt from 80% of the roof area flows into a 1,100-litre plastic cistern. This chlorine-free water can be used for watering lawns and gardens during dry periods. In building the EnviroHome, Challenger Homes found that they achieved a 75% reduction in construction wastes as compared to traditional construction.



Challenger Home's EnviroHome includes a 1,100-litre rainwater cistern which collects water for watering lawns and gardens.

Many of the materials used in the construction of the EnviroHome were made from recycled materials or were environmentally friendly. Conventional paints, carpeting, counter bases and insulating materials can release potentially harmful vapours into new homes. Challenger Homes selected materials that do not "off-gas", resulting in better indoor air quality. All indoor paints were water-based with the federal Eco-Logo approval. Carpets were manufactured from recycled plastic pop bottles. Cabinets and counter tops were manufactured from a wood-composite product with low off-gassing, and the counter top adhesives were formaldehyde-free.

Several other products in the home were manufactured from recycled materials. The cellulose insulation, used in both the walls and ceilings, was made from recycled newsprint. The wall sheathing was made from 95% recycled paper and cardboard. The deck was constructed of lumber made from recycled plastic and the rubber paving stones were made from recycled tires. The ceramic tiles were made from recycled glass.

The framing lumber used was finger jointed and glued, manufactured from short pieces of wood that have traditionally been burnt as waste wood. The foundation was constructed of hollow polystyrene forms filled with fly-ash concrete. The fly-ash concrete has a high content of waste ash from coal-burning power plants.

The EnviroHome also has many features which will result in waste reduction during the life of the home. The home has a high efficiency integrated forced-air furnace and water heater. The home also has an innovative air exchange system which ensures a clean, fresh air supply to the home while recovering heat from warm air exhausted through a heat exchanger.

Windows used in the home are high-efficiency and triple-glazed. Energy efficient compact fluorescent lights have been used in many areas of the home. The toilets are a low-flow design using 70% less water than conventional toilets, and water-conserving faucets and shower heads have been installed.

In many cases, the materials used in the EnviroHome, such as the wood products, paints and carpets, cost no more than conventional materials. In other cases, the materials may be more expensive but will result in long-term savings. These include materials such as the high-efficiency heating system, higher quality insulation and maintenance-free plastic lumber deck. The long term benefits of the EnviroHome are the opportunities to demonstrate the waste minimizing, energy and resource efficient home building techniques which will likely be the standard practice of the future.

Project Results

The City of Edmonton waste audit study showed a 26% decrease in construction waste through simple education programs aimed at reduction and reuse. An additional 27% decrease was achieved through recycling. The Partners In Clean Construction program anticipates a 20% decrease in construction wastes in one year through reduction and reuse. In building the EnviroHome, Challenger Homes achieved a 75% reduction in construction wastes as compared to traditional construction.

Reducing Manufacturing Wastes

Colgate-Palmolive Canada, Edmonton

Project Summary

Business Background: Colgate-Palmolive manufactures chlorine bleach, fabric softener and stain remover at its 3,700-square metre Edmonton plant.

Project Description: Colgate-Palmolive has made many process changes which reduce and reuse materials while improving production efficiency. They also recycle plastic, corrugated cardboard, used oil and office paper from the plant.

Business Background

Colgate-Palmolive is an international manufacturer of consumer products. The 3,700-square metre Edmonton plant manufactures chlorine bleach, fabric softener and stain remover for distribution from northern Ontario to British Columbia. The plant produces approximately 8,000 cases of product per day.

Project History

Throughout its international operations, Colgate-Palmolive operates a Global Enviropride Program. This program encourages plant managers and employees to identify opportunities to reformulate products, and to reduce, reuse and recycle materials in order to minimize wastes.

The Edmonton manufacturing plant has a long history of waste minimization projects, many of them aimed at improving production efficiency and reducing costs. The Edmonton plant was built in 1957 and has been upgraded and re-engineered several times, with major renovations in 1977 and again in 1992.

Many of these upgrades have had environmental benefits. Several years ago, all of the water-cooled compressors and chillers were replaced with air-cooled units. This resulted in less water usage and less water to the sewer. Also, warm air from the cooling units is vented into the building in winter and vented outside in summer. This has resulted in a savings of approximately $10,000 per year in natural gas heating costs.

Similarly, whenever electric motors are replaced at the plant, they are replaced with high efficiency motors. The high efficiency motors have a 95% energy efficiency compared to 75% for the older motors. This results in lower energy costs in the plant.

Rinsates from equipment clean-outs are collected in 1,136-litre plastic tanks and are reused as process water.

Other waste reduction systems have been added over the years as the plant has developed. Many of the projects were developed by the plant manager as cost efficiency projects. Several of the projects also came from employees who identified waste reduction opportunities. As a result, the plant has a long history of waste reduction. They have been recycling corrugated cardboard since 1985 and plastic since 1989.

Project Description

The Edmonton manufacturing plant produces its own lightweight, blow-moulded plastic product bottles. The plant can manufacture 50,000 high density polyethylene (HDPE) bottles per day on five machines. They use 80,000 kilograms of plastic resin every two to three weeks to manufacture bottles.

All flashing, which is excess plastic on the bottle after the moulding process, is reground and reused in making new bottles. This is standard practice in the plastics manufacturing industry. The plant will use about 25% in-house reground plastic in the manufacture of its bottles. They also purchase post-consumer plastic pellets for use in their bottle manufacturing. They can use up to 25% post-consumer plastic in their bottle without encountering problems with bottle quality.

Colgate-Palmolive uses modern blow moulding equipment with profilers which provide an accurate and consistent bottle thickness. The use of the profilers and changes in plastics technology have allowed them to reduce the weight of the bottle by 30% since 1989. Also, Colgate-Palmolive has redesigned the bottle shape to obtain more product per case. This, along with stronger strength bottles, has resulted in the use of lower strength corrugated cardboard in the cases. The net result has been a 14% increase in the amount of product in a pallet of cases.

Also, in 1992, Colgate-Palmolive changed from a glued paper label to a slip-on plastic sleeve label which now makes the entire bottle recyclable.

Any plastic which has become dirty or has been coloured at the plant cannot be reused in-house to produce white bottles. This plastic is reground at the plant using an older grinder which was replaced on the bottle manufacturing line. This mixed reground plastic is stored in reused corrugated gaylords that virgin plastic colour concentrate is received in, and is sold to a manufacturer of plastic pallets. The plant ships approximately 2,725 kilograms of this plastic per month to the recycler and receives 9 cents per kilogram in revenue.

Most of the raw materials for the manufacturing of the bleach, fabric softener and stain remover are received at the plant in bulk and are unloaded directly from tank trucks to storage tanks. Therefore, there is very little container waste. Some products are received in 200-litre plastic drums which are returned to the supplier for a deposit credit. Colgate-Palmolive is encouraging its suppliers to provide these products in 1,000-litre reusable plastic tote tanks.

Project Costs

Capital Costs: *Waste-minimizing capital purchases have been part of ongoing plant efficiency and pollution control upgrades.*

Annual Operating Costs: *Most waste-minimizing process changes have also resulted in greater cost-efficiency.*

Revenues & Savings: *$2,945 per year in revenue from sale of plastic which is not suitable for in-house reuse; unspecified revenue from sale of corrugated cardboard; most process changes have resulted in savings in energy, water and raw material costs.*

The products manufactured at the plant are produced in batches. At product change-over, the bottle-filling equipment is drained and cleaned. Drained product and rinsates from the clean-outs are collected in two 1,136-litre plastic tote tanks and are reused as process water in manufacturing new product. There is a separate clean-out collection tank for bleach and for fabric softener.

Waste water from spills or floor washings goes to sumps and then to a storage tank where it is tested, treated, neutralized and drained to the sewer. This waste water containment and treatment system was installed in 1990 at a cost of $250,000. Currently, less than 0.1% of the process water is sent to the sewer. Also, the plant manager is researching an ozone waste water treatment system which would be more cost and energy efficient than the current chemical treatment.

On the filling line, a wash-down on the conveyor is connected to the conveyor by a solenoid. When the process conveyor shuts down, the conveyor wash also automatically shuts off, thus conserving water.

Also, on the filling line, leaking or defective bottles are drained on a rack and the product is reused. Perfumes are added by injection to the bottles after they are filled. Previously, the perfume was added to batches of the product before filling. However, this made it difficult to reuse products from equipment clean-outs.

Colgate-Palmolive uses 8,000 corrugated boxes per day to ship product from their Edmonton plant. Any damaged boxes go to a 30-cubic metre compactor bin which is picked up by a recycled paper broker. Corrugated packaging from some purchased large-size plastic bottles also goes to this bin. The plant currently recycles about 6,300 kilograms of corrugated cardboard per month.

Corrugated boxes, which bottle labels and caps are received in, are sold to the distribution warehouse of a giftwares retailer where they are reused for shipping products.

After the bottled products have been cased in corrugated cardboard boxes at the plant, they go to an automatic pallet stacker. As they enter the stacker, each box is sprayed with a pallet stabilizer which is an adhesive that causes the boxes to stick together and form a very stable pallet of product. By using pallet stabilizer, no plastic shrink wrap is required on the pallet. The adhesive simply pulls apart when the boxes are unloaded, and the customer does not have any shrink wrap to dispose of. There is also a cost advantage as the pallet stabilizer cost 15 cents per pallet, while shrink wrapping costs 75 cents per pallet.

Colgate-Palmolive has also made some other smaller changes to reduce wastes. They use synthetic oils in all equipment. The synthetic oils provide better lubrication which results in lower energy costs, lower equipment maintenance costs and longer equipment life. All of the used oils are sent to a recycler when equipment is drained for servicing. Office paper is also collected and shipped to a paper recycler every 6 months.

Almost all of the waste minimization projects at the Colgate-Palmolive Edmonton manufacturing plant have been undertaken as cost and production efficiency projects. Therefore, they are not only reducing wastes but are improving the cost picture as well. The plant manager estimates that the quantity of wastes leaving the plant has been reduced to 25% of what it was 10 years ago, while the plant has gone through several increases in production capacity during that period.

Project Results

Colgate-Palmolive has reduced water, energy and raw material usage through process changes. The weight of their blow-moulded plastic bottle has been reduced by 30% since 1989 and now has a 25% post-consumer recycled plastic content. The plant ships 32,700 kilograms of plastic and 75,600 kilograms of corrugated cardboard to recyclers each year. Overall, the plant manager estimates a 75% reduction in wastes over the past ten years while plant production capacity has increased.

Reducing and Recycling Office Supplies

Capital City Savings, Edmonton

Project Summary

Business Background: Capital City Savings is a credit union offering financial products and services through 20 branches in the Edmonton area. The corporate offices and central supply centre are located in southeast Edmonton.

Project Description: Capital City Savings has introduced the use of electronic mail and two-sided printing to reduce paper usage. They use reusable plastic pouches for inter-office mail and round-trip envelopes for credit card statements. Recycling programs are in place for office paper, corrugated cardboard, printer ribbons and toner cartridges.

Capital City Savings sends printer ribbons and toner cartridges for recharging and recycling.

Business Background

Capital City Savings is a credit union offering financial products and services through 20 branches located in Edmonton and surrounding communities. Capital City Savings has approximately 400 employees throughout its operations. Their waste reduction efforts are focused through the corporate offices and central supply centre located in southeast Edmonton.

Project History

Many of Capital City Savings' waste reduction projects have been developed since 1992 as a result of a corporate policy to reduce wastes. Capital City Savings also participated in a City of Edmonton pilot waste reduction study in 1993 which identified a number of waste reduction opportunities. Many of the waste reduction efforts are coordinated through the central supply office.

Project Description

Capital City Savings' has taken several steps to reduce office paper use. Electronic mail is used to reduce the number of paper memos sent between branches and departments. The use of electronic mail has also resulted in faster responses between offices. Capital City Savings has also converted to distributive print to reduce the number of paper reports printed. Rather than having all reports centrally printed in Calgary, the branches now receive reports electronically and can choose whether or not to print them. If a paper copy is required, the reports are printed on high-speed printers in the branches using both sides of the paper.

Previously, reusable paper envelopes were used for inter-office memos. Plastic pouches, which have a longer life and make more trips before disposal, are now used instead of paper envelopes.

Capital City Savings has also reduced paper waste by using round-trip envelopes to send credit card statements to their customers. The customers simply remove a flap and reuse the envelope to send their payment back to the credit union. This has reduced envelope costs and saves about 20,000 envelopes per month.

Capital City Savings has also switched to linen towels rather than paper towels in their washrooms.

In the area of recycling, all confidential paper is shredded on-site at the branches and is placed in two 175-litre wheeled toter bins located at each branch.

Project Costs

Capital Costs: *Minimal additional capital costs to implement waste reduction program.*

Annual Operating Costs: *Approximately $200 per year for confidential paper recycling at each branch. Costs of pick-up of corrugated cardboard and non-confidential papers are not available.*

Revenues & Savings: *No revenues are received for the recycled materials at this time. Savings are achieved through reduced purchases of paper and envelopes, lower cost recycled printer ribbons and toner cartridges, and reduced waste disposal costs.*

These toters are emptied by a recycling service contractor at a cost of $8 per bin per pick-up. The bins at the branches are picked up at least once per month.

Non-confidential office papers, newspapers and magazines are collected in desk-side cardboard trays at all of the branches. The trays are emptied into a 6-cubic metre bin located outside at each branch. These large bins are picked up on a monthly basis by another paper recycling contractor who charges a per pick-up fee.

Corrugated cardboard boxes which are received at the central supply office are reused to ship materials to the branches or are reused within the main office. Any corrugated cardboard which is not reused is added to the non-confidential paper bin for recycling.

Annually, out-of-date telephone books are also collected from the branches and sent for recycling.

Used computer printer ribbons and toner cartridges are returned to the central supply office from the branches. These ribbons and cartridges are returned using the same courier who makes deliveries to the branches. From the central supply office, the ribbons and cartridges are sent for recharging and recycling. The central supply office also purchases recycled ribbons and cartridges, except for use in certain sensitive pieces of office equipment.

At the main branch and corporate offices, beverage cans are collected for recycling. The revenues from the cans are used to re-stock the pop machine.

Capital City Savings has also recycled some out-of-date office equipment by returning it to the manufacturer for dismantling or by donating it to schools.

While Capital City Savings was unable to provide an overall cost for their waste reduction programs, they feel that their efforts are resulting in significant savings in the purchase of return mail envelopes, inter-office envelopes, corrugated cardboard boxes and recycled printer ribbons and cartridges. They also feel that they are saving in waste disposal costs by requiring fewer pick-ups of their garbage disposal bins.

Project Results

The City of Edmonton waste reduction study estimated a 75% reduction in Capital City Savings' wastes through paper recycling and waste reduction efforts.

Reducing and Recycling Restaurant Wastes

MT Management Inc., Edmonton

Project Summary

Business Background: MT Management Inc. owns and manages 10 family dining restaurants in Alberta and British Columbia. Total employment is 1,100 or typically 100 people per restaurant.

Project Description: In addition to recycling corrugated cardboard and 16-litre plastic pails, a variety of material and energy waste reduction practices are incorporated into the business operation.

Business Background

MT Management Inc. entered the food service industry in 1982 with one restaurant location in Edmonton. The business has added an average of one new establishment per year in recent years. MT Management Inc. now owns and manages 10 family dining restaurants, nine of which are located in Alberta, with one in British Columbia. Total employment is approximately 1,100 or typically 100 people per restaurant. Each restaurant includes space occupied by kitchen, dining, and beverage operations.

Project History

MT Management's director of purchasing began considering waste management options for the restaurants in 1988 when it was recognized that there was a potential to reduce waste disposal costs. At that time, the business was paying for the 4.5-cubic metre waste bins located behind the restaurants to be emptied 6 times per week. Most of the waste filling these bins was plastic pails, metal cans and cardboard packaging. Much of this waste was generated from the 50 to 60 cases of 3-litre food tins each restaurant was receiving per week, and the corrugated cardboard each case was packaged in.

The purchasing manager began to work with disposal companies and suppliers to see if they could provide service options which reduced the amount of waste each restaurant outlet was handling and disposing of in landfills. Negotiations were not easy at that time since very few businesses were looking at waste management and few alternatives were available. However, in 1989, some key programs were implemented to begin replacing tin food cans and recycling corrugated cardboard and 16-litre plastic pails.

Since that time, MT Management has expanded on these programs with a variety of other energy and material waste reduction programs supplemented by customer education activities. The latter serve to both educate customers and to ensure that the business receives the public relations benefits for its waste management efforts.

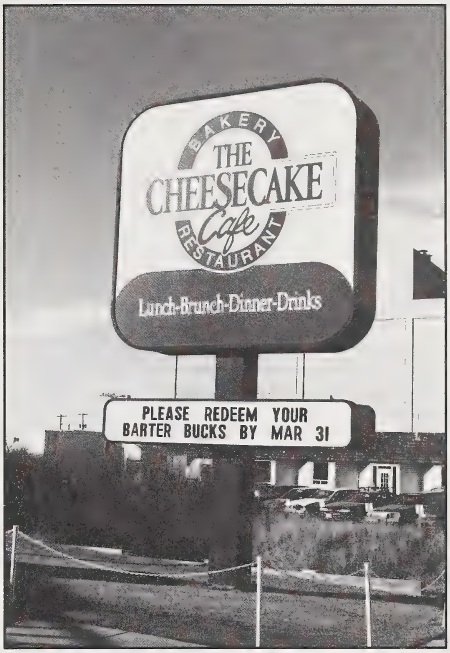
Project Description

The first step of the program was to segregate corrugated cardboard from other wastes. A separate bin was placed adjacent to the regular waste bin at each restaurant to receive flattened cardboard and arrangements were made with the disposal company to transport the cardboard to a recycler. Collection of the cardboard bins is scheduled to occur on the day following the delivery of supplies. If bins are not filled, it is possible to delay collection to avoid unnecessary costs. Since the collection company receives the revenues from the sale of the corrugated cardboard, MT Management was able to negotiate lower collection fees for the cardboard bins.

When the search for an alternative to metal can disposal began, viable metal can recycling options were not available in the area. After discussions with suppliers, MT Management was able to switch the canned supplies to plastic pouches. This reduced both the weight and volume of waste material placed in the landfill disposal bins.

Each restaurant unit typically generates thirty 16-litre plastic pails per week. Following discussions with suppliers, arrangements were made to have these pails collected by the supplier and returned for recycling. The pails are washed and stored in a small fenced enclosure at the rear of the restaurants. These enclosures also contain the waste and cardboard bins, along with other reusable materials such as plastic bakery trays.

MT Management is well aware that organic food scraps and left overs are a large part of their operation's waste generation. While they have found no suitable alternatives to disposing of this waste, they have implemented a source reduction option. A significant portion of their menu is devoted to chicken preparations. Discussions with the chicken supplier resulted in a switch to receiving boneless chicken breasts at the restaurants. This resulted in the meat being trimmed at the supplier with approximately 200 kilograms per week of unused poultry scraps being generated at a central location rather than at the dispersed restaurant locations. By generating this unusable material at the supplier's plant, large volumes of previously wasted scraps were accessible in one location for reprocessing into other products. Disposal of the smaller volumes at each restaurant was avoided. The increased cost of purchasing prepared meat is considered to be offset by the reduced preparation labour in the restaurants.



The Cheesecake Cafe in Edmonton is one of ten MT Management restaurants with a waste minimization program.

MT Management continues to be environmentally conscious throughout its restaurant operations and a number of other waste management programs have been incorporated. For example, traditional high temperature dishwashers using strong chemical cleaners have been replaced by modern low temperature equipment using biodegradable soaps. This switch in technology was implemented at no cost since the equipment switch and installation was completed as a service of the equipment manufacturer.

Other waste minimization efforts include use of long lasting, energy efficient light bulbs and reduced natural gas consumption by lowering thermostats when restaurants are closed. Single-serving condiments, packaged in paper or plastic, have been replaced by metal and plastic containers on the tables. Ketchup bottles are refilled from bulk containers. At some outlets, paper napkins have been replaced by reusable cloth napkins. Hand crafted, washable decorations for special occasions are purchased from non-profit environmental groups to support celebrations such as Earth Day. Left over paint supplies are also donated to non-profit groups such as a local youth emergency shelter. All paper products, including napkins and menus, are made from recycled paper and the head office participates in an office paper recycling program.

The implementation of these programs has required no additional training for staff who have been very willing to take the minimal time required during

Project Costs

Capital Costs: *No additional capital costs for implementing the waste minimization program.*

Annual Operating Costs: *No additional annual operating costs.*

Revenues & Savings: *Reduction of waste disposal costs by 56% over five years from $14,400 per year to $6,312 per year per restaurant unit.*

an 8 hour shift to flatten cardboard or wash plastic pails and place them in the proper location. Staff are proud of the waste minimization program. In addition to the staff support, kitchen managers continue to find the waste minimization initiatives simple to implement.

For the first two years of the program, the general public and customers were not aware of the waste minimization efforts. However, an information brochure entitled “At Our Restaurants Every Day Is Earth Day” was subsequently produced which summarizes the waste management and other environmental and socially responsible initiatives undertaken by MT Management. This brochure clearly states MT Management’s commitment to the quality of Alberta’s environment. This commitment to environmental quality is considered to be part of doing business and any extra costs are accepted as necessary in making environmentally sound business decisions.

The quantities of specific wastes reduced have not been tracked by MT Management but the success of the waste minimization program is reflected in the overall waste collection figures. In 1989, the business was paying for the collection of a 4.5-cubic metre waste bin six times per week per restaurant unit. At that time, the average cost for this service was $277.50 per week ($46.25 per collection). Collection of the 3-cubic metre cardboard bin was costing $90 per month in 1989. Thus, total 1989 waste collection costs were $1,200 per month for each restaurant.

Through the implementation of the waste minimization practices and negotiations with the waste contractor, these costs have been reduced. In 1994, waste collection costs had been reduced to $114 per week or $28.50 per waste bin collection only four times per week. Cardboard collection costs have been reduced to $70 per month through negotiation with the waste collection contractor. With the cost of cardboard collection included, waste collection costs have been reduced by 56% over five years for a typical restaurant unit.

This success has been achieved through negotiation with waste contractors and discussion with suppliers to find solutions and alternative products to meet their needs. In 1989, many waste management solutions were not readily available and the purchasing director had to aggressively search for alternatives. In recent years, it is felt that solutions are more readily available as more businesses are demanding similar waste minimization services.

Project Results

Diversion of 200 kilograms per month of food waste. Reduction in waste bin collection from six collections per week to four per week per restaurant.

Reducing and Recycling in Food Retailing

Canada Safeway and Meadowlark Safeway, Edmonton

Project Summary

Business Background: Meadowlark Safeway is a 3,900-square metre food retail outlet. The store employs 155 people and has been in operation since early 1994. The store, one of more than 80 Canada Safeway retail outlets in Alberta, is associated with a shopping mall and is supplied from a distribution centre in Edmonton.

Project Description: Corrugated cardboard, plastic wrap and post-consumer plastic grocery bags are gathered for recycling from individual stores using back hauls to the distribution centres. The Meadowlark Safeway has also taken innovative steps that reduce paper waste and make the collection of plastic more efficient.

Business Background

Meadowlark Safeway is a new 3,900-square metre retail outlet which includes grocery, drug, and floral operations. The store employs 155 people and has been in operation since early 1994. It is one of Canada Safeway's more than 80 retail outlets in Alberta. The store is associated with a shopping mall and is supplied from a distribution centre in the city. Canada Safeway supplies its stores in Alberta from distribution centres located in Calgary and Edmonton.

Project History

With an increasing awareness of waste management issues, waste regulation, and increasing tipping fees in the 1980s, Canada Safeway began to address waste minimization through programs coordinated by its distribution centres. Prior to that time, corrugated cardboard had been recycled but Canada Safeway recognized that there were other waste minimization opportunities.

Today, waste minimization in Canada Safeway's operations has matured to the point where a variety of reduction and recycling practices are used.

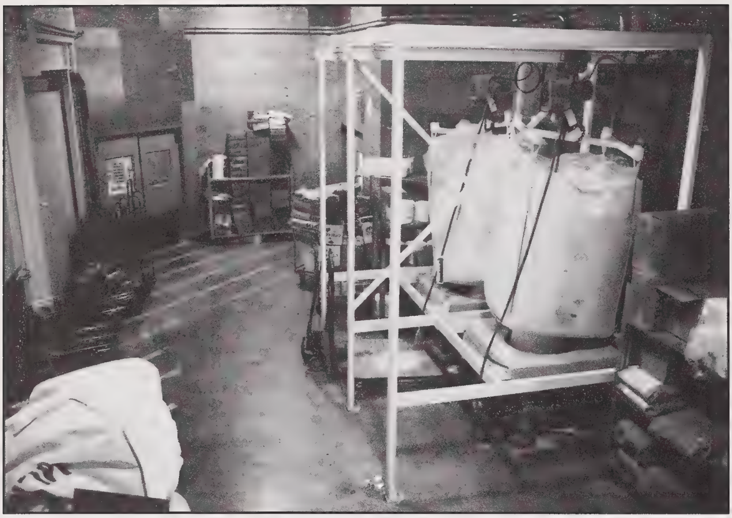
Many of the waste minimization options have been developed at the corporate level to assist individual stores in dealing efficiently with their waste materials. Other programs encourage customers to make their own waste management choices from appropriate alternatives. The construction of a new store at the Meadowlark shopping centre in 1993 allowed Canada Safeway to install some site specific waste reduction technology.

Project Description

Canada Safeway has been able to make good use of its distribution system to collect and transport corrugated cardboard and plastics for recycling. These recyclable materials are handled in relatively confined work and storage space at the back of the individual stores before being loaded for back haul to the distribution centres.

Plastic wrap, used to wrap pallets of incoming supplies, is collected in the back work area of the stores and placed into large plastic bags. Customers are also encouraged to return plastic grocery bags to the front of the store where they are collected in large bags in receptacles. With the exception of wax coated produce boxes, all corrugated cardboard is collected and baled at the stores. When a delivery is made to a store from the distribution centre, the collected plastic and cardboard are loaded onto the trailer and returned to the distribution centre. Reusable containers such as milk crates and bread trays are also returned to the distribution centre on these trucks.

At the distribution centre, the bags of plastic and bales of cardboard are unloaded and stored at the front of the warehouse. These incoming materials are sorted, the plastic is baled, and the materials are loaded into large trailers. There is usually adequate floor space to handle and sort the materials although congestion problems do occur at times at the Calgary distribution centre. This occurs when a second trailer is not available to take additional materials when the first trailer is full.



Refillable bulk storage and delivery system for flour eliminates the use of 20-kilogram paper sacks in the in-store bakery.

The recycling operations at the Calgary distribution centre employ five full or part-time people whose duties include handling and sorting recyclable materials, pallets and plastic milk crates. The wages for these five employees amount to about $160,000 per year. Equipment used to handle the materials include a small pallet sorter and a baler for the plastic.

The Meadowlark store has taken advantage of an employee innovation to facilitate the handling of the plastic generated at the back of the store. Previously, when the store was busy, placing the used plastic into bags suspended from work tables or wall hooks was difficult and plastic accumulated on the floor in the confined working space at the back of the store. This often made it difficult to work in the space and the night staff faced the task of cleaning up the debris.

One Edmonton employee recognized this problem and designed a metal rack which holds the mouth of the bag open for easy filling. A quick release rubber band allows for easy replacement of full bags. The wide-open mouth allows plastic to be deposited and compacted by hand with little effort resulting in more plastic being compressed into each bag. Because the rack is light weight, it can be moved easily to any convenient location or removed from the work area when not in use. One rack has been mounted on a wheeled dolly to facilitate movement. The Meadowlark store uses five of these racks and has found them to be so successful that two or three more may be ordered.

In the retail areas of the stores, customers are encouraged to bring their own reusable grocery bags or they can drop off used plastic grocery bags for recycling. To facilitate reduction in the amount of plastic bags used, the store offers reusable nylon shopping bags or reusable cardboard tote boxes at reasonable prices. Bag waste is also reduced as cashiers are encouraged not to assume that they should bag pre-packaged bulk items such as potatoes. Instead, customers are asked if they wish to have these items bagged.

The Meadowlark store has been able to eliminate the use of disposable 20-kilogram paper sacks for flour used in their in-store bakery. An innovative silo system has been incorporated into the new store which makes use of a vacuum system to draw flour from 1,000-kilogram bulk tote bags suspended on a large frame using an electric winch. When the bag is empty, it is returned to the supplier to be refilled.

Several years ago Canada Safeway became concerned about the rising cost of pallets. The cost of a pallet has risen from about $5 per pallet in 1990 to nearly $20 per pallet in 1995. The traditional system of pallet circulation meant that pallets were not necessarily being returned to Canada Safeway's operation. About $100,000 per month was being spent on new pallets to ensure they were available when they were needed.

The system for back hauling cardboard and plastic to a central location also applies to pallets. On the floor of the same distribution centre which receives cardboard and plastic, pallets are sorted and stacked according to size and type. Good pallets are kept for reuse in shipping orders to stores while damaged or non-standard pallets are withdrawn from circulation and hauled to a recycler or repair facility when sufficient quantities are collected. Plastic pallets are currently being tested as an alternative to wooden pallets.

Canada Safeway installed a computerized national pallet inventory system which tracks the number and flow of pallets which they and other members of the Canada Pallet Council have purchased. This computer tracking system allows pallets to be redistributed where they are required. Should pallets be required in Canada Safeway's distribution system, they examine the computer inventory and obtain pallets from another Canada Pallet Council member who has excess pallets in storage. Conversely, when Canada Safeway develops a large inventory of pallets, these pallets and their location will be visible on the computer inventory and another Canada Pallet Council member may contact them to obtain pallets.

In order to make the above pallet reuse system work, the participants buy, and enter into circulation, standard quality pallets which are colour coded, compatible with fork lifts, designed to be more durable than previous pallets, and designed to permit repairs from time to time. At stores such as Meadowlark Safeway, empty pallets are stored neatly in order that they may be readily loaded onto a delivery trailer for back haul to the distribution centre.

The Meadowlark store also implements the "Environmental Options" program which offers on-the-shelf information to assist customers in selecting products with less impact on the environment. Many of these options identify products which reduce waste through reduced packaging. In the Meadowlark store, waste minimization is also promoted by encouraging staff to offer waste management suggestions and by bright posters hanging in the staff areas to remind employees of appropriate practices such as bagging options which reduce waste. An area of the parking lot is also committed to a community recycling depot consisting of bins for a variety of household recyclables.

The Meadowlark store manager finds that as long as his customers are offered a choice which suits their needs, they seem to support waste minimization and the programs which have been initiated. While no formal staff training sessions have been required, the manager has found it necessary to continually emphasize the need to properly segregate cardboard and plastic for recycling.

Project Costs

Capital Costs: *Approximately $10,000 per store for cardboard baler and $2,000 for flour storage and delivery system.*

Annual Operating Costs: *Existing transportation systems are used and most costs are included within normal staff wages. Some costs are incurred at the regional level for delivery of materials to recyclers.*

Revenues & Savings: *Tipping fees are avoided at the store level. Plastic recycling remains a direct expense at the regional level while revenues for corrugated cardboard cover the delivery costs.*

The recycling of plastic and cardboard are closely tracked by Canada Safeway's head office in Calgary which is able to report on the success of individual stores as well as the regional operation. The Meadowlark store is currently diverting 25 tonnes of corrugated cardboard from landfill each month and avoiding the associated tipping fees. The two distribution centres in Alberta are sending about 15 tractor trailer loads of baled cardboard per week for recycling at a cost of about $5,000 to cover the cost of hauling to the recycler. The recent high prices for cardboard have offset these costs.

The Meadowlark store sends approximately 90 bags of loosely compacted plastic to the distribution centre each week. Approximately 10 bales of sorted plastic are recycled from all contributing stores each week. This has resulted in the recycling of 136,360 kilograms of plastic wrap and 345,455 kilograms of used consumer bags per year. Since 1991, this plastic recycling has been a direct expense to Canada Safeway for sorting, baling and delivery to the recycler.

Canada Safeway feels there is a need to increase the efficiency of waste minimization and participation rates at the stores. In order to offer some measurable feedback to store managers, a recycling index is being introduced. The index is the amount of materials returned for recycling from the store expressed as a percentage of all materials which are recycled or landfilled from that store. Rates as high as 70% occur in some stores with the Meadowlark store currently reaching 57%. Due to many variables among store operations and locations, it is difficult to use the recycling rate to compare stores. The index will, however, allow individual stores to measure their own progress in reducing waste.

While Canada Safeway's waste minimization program is very successful, they continue to look for ways to improve. For example, they continue to look for ways to reduce the amount of staff time spent sorting plastics at the distribution centre. Plastic returned by customers often contains a variety of unacceptable materials.

The next waste stream to be diverted from landfill will be the large amounts of compostable material generated by the stores. Canada Safeway is currently setting up a composting test project which will involve two stores contributing their compostables to private commercial compost operations.

Project Results

Twenty-five tonnes of corrugated cardboard are diverted from landfill per month at the store level. Distribution centres in Alberta send about 15 tractor trailer loads of baled cardboard per week for recycling.

The Meadowlark store collects approximately 90 bags of loosely compacted plastic per month. The distribution centres recycle 136,360 kilograms of plastic wrap and 345,455 kilograms of used consumer grocery bags per year.

Reducing and Recycling Hotel Wastes

Banff Springs Hotel, Banff

Project Summary

Business Background: The Banff Springs Hotel is an 845 room hotel in a busy resort town located 130 kilometres from Calgary. One of several operated by Canadian Pacific Hotels and Resorts, the hotel has a base employment of 800 people.

Project Description: Recyclable and reusable materials are segregated from the hotel waste stream. Shredder/compactors reduce the volume of both recyclables and wastes for efficient transport. Reduction programs are applied to guest amenities to reduce the amount of non-recyclable waste.

Business Background

The Banff Springs Hotel is an 845 room hotel in a busy resort town located 130 kilometres from Calgary. One of several hotels operated by Canadian Pacific Hotels and Resorts, it employs 800 people in winter and about 1,200 in the busy summer season.

Project History

In 1990, Canadian Pacific Hotels and Resorts began work on its environmental plan which culminated in the publishing of a corporate "green" guide in 1992. The "Green Partnership Guide: 12 Steps to Help Create an Environmentally Friendly Setting for Our Guests, Ourselves, and Our Future" set specific goals for the waste reduction program and other environmental objectives. Senior management at the corporate and hotel levels were very involved in ensuring that the programs identified in the guide were implemented.

Waste reduction programs in individual hotels are developed with input from employees. The employees also receive a staff handbook which discusses the corporate policy on waste management.

As early as 1988, the Banff Springs Hotel staff began collecting beverage containers and bottles for recycling. More recently, waste management programs have been established at the hotel with the assistance of an environment committee made up of representatives from the various hotel departments. While some members of the committee are designated by senior management, any employee can volunteer to participate.

The program began with few resources by converting some existing waste containers into recycling bins located throughout the hotel work areas. With experience, the program evolved to the point where blue boxes are located in guest rooms and sorting stations are strategically located where waste and recyclables are handled by staff.

Recyclables are collected from room service trays and dishes before they enter the dishwasher at the Banff Springs Hotel.

Project Costs

Capital Costs: *$34,000 for shredder/compactors; $12,500 for blue boxes and customized bins.*

Annual Operating Costs: *$6,000 per year for transporting recyclable materials markets.*

Revenues & Savings: *Unspecified revenues from deposits on beverage containers. Minimal revenues are received for other recycled materials at this time.*

Project Description

The Banff Springs Hotel collects corrugated cardboard, metal cans, glass, beverage containers and a variety of paper for recycling. These materials are collected using sorting bins for the materials located next to staff work stations. For example, a kitchen work station might include bins for beverage containers and metal cans. An office area would have bins for office paper.

Each guest room also contains a bin for general waste and a small, desk-side blue box for commingled recyclables identified on a list in the room. When the blue box contents and general guest room wastes are gathered by housekeepers, they are placed in a central location on the same floor of the hotel where they are collected.

The sanitation and recycling staff take the materials collected from the work areas and guest rooms to a materials handling area in the basement of the hotel. In this area, materials may be placed directly into the appropriate storage bins or, if the material is unsorted, it is dumped onto a sorting table where recyclables and reusable items like coat hangers and tableware are removed and placed into the appropriate table-side bins. The waste that remains is then pushed into the shredder/compactor at the end of the table. The general waste is compacted in specially designed bins to facilitate collection by Town of Banff vehicles.

Various methods are used to store recyclable materials in the basement area. Beverage containers are sorted onto shelves in a hallway. Newspapers and office papers are sorted into gaylords. Corrugated cardboard is shredded and placed in 1-cubic metre nylon bags which are then stored outside. Insufficient space for sorting and storing materials is a problem at times.

Since Banff is far from recyclers in Calgary, some materials and wastes are processed to reduce the volume and reduce shipping costs. Cardboard and metal cans, for example, are shredded and stored in the large nylon bags. These materials are shipped to markets in Calgary by contract haulers. Other materials, such as papers and beverage containers are transported by hotel vehicles to recycling depots and drop-off centres in Banff.

Due to the large amount of labour involved in sorting, the program emphasizes source separation in the work areas. For example, paper collection and sorting can take eight hours per day but this can be reduced to two hours per day if papers are separated properly in the work areas.

To accomplish the processing of materials, the hotel operates two shredder/compactors which cost $17,000 each. One is used for solid waste and the other is used for recyclables, primarily corrugated cardboard.

A number of waste reduction programs have also been initiated in addition to collecting and sorting recyclables. In guest rooms, low density guest soap bars are used to minimize the amount of soap consumed and thrown away when rooms are cleaned. A concave soap bar design also reduces the amount of soap in each bar. Staff washing areas are being outfitted with wall-mounted soap grinders which grind a solid soap bar and reduce the amount of soap consumed. At one time, unused amenity shampoos and conditioners were offered to social shelters to avoid placing them in the waste stream. The markets for this practice are no longer available. Instead, the hotel has now reduced the size of amenity containers by 30% to reduce both the amount of container wasted and the amount of residual contents left by each guest.

At one time, nearly empty toilet paper rolls were replaced. Toilet paper rolls are now left in place until completely empty with a second role handy for replacement purposes.

In the office areas, staff are encouraged to use both sides of paper, minimize the amount of circulation for memos such as daily room and dining assignments, and use internal electronic mail to reduce paper waste.

One source of waste in the receiving area of the hotel is excessive supply packaging. At least one supplier has been convinced to eliminate shrink wrap and use one large cardboard box instead of four smaller boxes for shipping replacement drinking glasses. A supplier of cleaning products also takes back its own empty plastic containers.

In order to ensure that the recycling program functions properly, the sanitation and recycling crew in the hotel have visited each department to explain the needs of the program and to discuss the needs of the department staff. In addition, the hotel environment committee meetings are open for any employee to attend to discuss their needs and concerns. Staff are kept abreast of the hotel's programs and general waste issues through the use of informative signs in work areas and an environment bulletin board outside the cafeteria. This board will soon feature a regularly updated report which tracks the hotel's environmental record by reporting energy, water and waste reduction figures.

Due to the distance to recycling markets, the hotel receives little direct economic benefit from its waste reduction program. Minimal revenues are received for recyclables and the hotel now spends about $6,000 per year for contactors to take recyclables to markets. Some expenses are also incurred locally as the hotel operates its own truck to take paper and beverage containers to local depots.

The diversion of waste is currently offering no direct economic incentive since waste collection is charged at a fixed rate and incorporated with business taxes levied by the Town Of Banff. The current waste collection charge works out to about $100 per tonne. Staff costs are not considered to be significant since most of the waste minimization effort is conducted by existing staff who have incorporated the tasks within their normal duties.

In addition to the shredder/compactors, the hotel spent about $10,000 to outfit the hotel with blue boxes and a variety of other bins. An additional $2,500 were spent for customized waste bins which were designed to be compatible with the Town's collection vehicle. The only revenues collected by the hotel are the deposits recovered on beverage containers.

In the near future, the cost of transporting cardboard may be eliminated as a supplier is offering to back haul corrugated cardboard to Calgary, as long as it meets certain bale size criteria, in return for the revenues from the sale of the material.

In spite of these costs, the hotel recognizes the public relations benefits of its program and feels the need to continue to be environmentally responsible. Of the materials tracked, the program recycles approximately 49 tonnes of corrugated cardboard, 5.5 tonnes of metal cans and 560,000 beverage containers each year. The quantity of paper delivered to the community recycling program is not tracked.

In the future, the hotel would like to find a composting alternative for the large amounts of food waste generated. The hotel would also like to find a system which reduces the time required by housekeeping staff to sort the blue box materials collected in each room. If the sorting and storage space problems can be overcome, the hotel would like to start recycling other materials such as plastics.

Project Results

The Banff Springs Hotel recycles 49 tonnes of corrugated cardboard, 560,000 beverage containers, 5.5 tonnes of metal food cans and an unspecified amount of paper each year.

Reducing and Recycling Medical Laboratory Wastes

Stirrat Laboratories, Edmonton

Project Summary

Business Background: Stirrat Laboratories' main laboratory facility in Edmonton employs 50 people and handles samples from Stirrat's smaller branches throughout the city.

Project Description: Stirrat Laboratories has selected analytical instruments which minimize wastes and has installed a solvent recycling system for laboratory solvents. They also recycle uncontaminated plastics, office paper, paperboard and corrugated cardboard.

Business Background

Stirrat Laboratories was founded in 1969. The initial laboratory was located in the Meadowlark Professional Building and had a staff of seven. The company has since expanded to 35 laboratories in Edmonton and surrounding communities. As a result of a change of ownership in 1981, Stirrat Laboratories is now part of a larger network of medical laboratories across Canada.

Stirrat's 930-square metre main laboratory facility in Edmonton employs 50 people. The main facility handles chemistry, microbiology, anatomic pathology and hematology samples from Stirrat's small branches throughout the city.

Project History

In 1989, a small group of employees at the main laboratory facility began researching recycling opportunities. As a result of their research, they began recycling corrugated cardboard, paperboard and office paper through a recycling service contractor. For the first four years, the employees also volunteered to take plastics from the main facility to a plastic recycler.

In the fall of 1994, Stirrat Laboratories changed to a different recycling contractor who was able to take their plastics as well as all of the paper materials. Changing contractors also resulted in a 75% savings in the cost of the recycling service.

Project Description

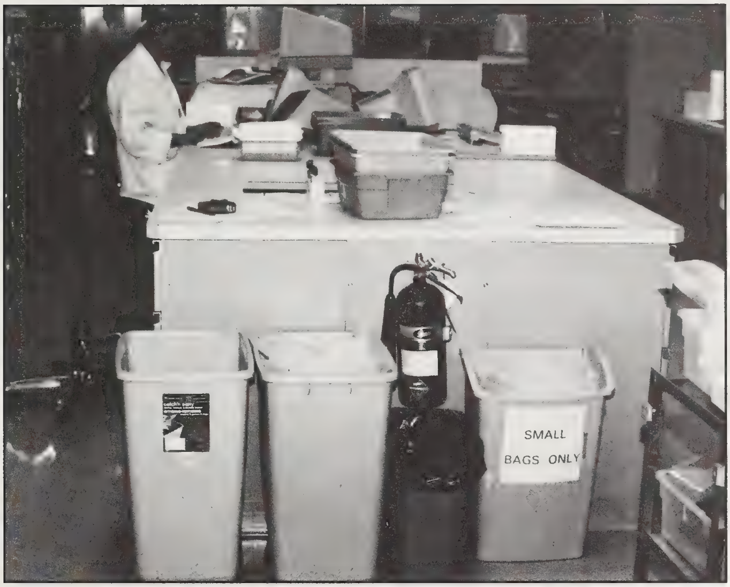
Waste minimization in a medical laboratory involves several special considerations not found in other industries. First, Stirrat Laboratories has very strict standards regarding the separation of contaminated from non-contaminated wastes. To avoid the infection hazards related to medical wastes, Stirrat Laboratories limit their recycling programs to clean paper and plastics.

All biomedical wastes from the laboratory are picked up on a daily basis by a certified medical waste handling company and are shipped to a licensed biomedical incinerator. Hazardous chemical wastes are collected by a hazardous waste contractor and taken to the Alberta Special Waste Treatment Centre in Swan Hills.

Stirrat Laboratories is also very concerned about patient confidentiality. Any documents containing laboratory results or patient information are shredded before they are recycled.

Stirrat Laboratories' first step in waste minimization occurs in the selection and purchase of analytical equipment. They realize that the real cost of operating equipment includes the cost of disposing of waste from the equipment. They have therefore chosen modern analytical equipment which minimizes wastes.

Stirrat Laboratories recently purchased two new instruments for chemistry testing which draw fluids for analysis from the tube which the sample was originally collected in. In older equipment, it was necessary to transfer the



Uncontaminated plastic bags are collected for reuse in shipping samples.

sample from the original sampling tube to a second tube or cup before analyzing the sample. The new equipment has eliminated the disposal of thousands of sampling tubes.

The new equipment also requires only a very small sample of fluid on a 1 cm by 1 cm filter paper. This results in very little testing waste to dispose of. The laboratory manager estimates that the new equipment has reduced the testing wastes by 30 to 50% over the previous equipment.

The purchase of solvents and the disposal of waste solvents can be a significant cost in a laboratory operation. In 1992, Stirrat Laboratories purchased a solvent recycling system. The recycling system consists of a distillation unit which separates the solvent from any contaminants and a cooling unit to recover the solvent.

The various used solvents from the laboratory operations are collected in separate 20-litre metal containers. A single solvent type is recycled in each batch operation through the recycling system. The recycling process for a 20-litre container of solvent normally takes from 4 to 12 hours depending on the solvent type. Because the system has a closed circuit water cooling system, no cooling water is sent to the sewer.

The cost of this type of recycling system is $30,000 and the lab expects to recover this over five years through a 75% reduction in solvent purchases and solvent disposal costs.

Stirrat Laboratories has several programs to reuse and recycle plastics within the operations. Samples are sent from the smaller laboratories to the main facility with the sample tubes placed in a styrofoam block enclosed in a plastic bag. The styrofoam blocks and some plastic bags are collected and sent back to the smaller laboratories for reuse.

There are several sources of plastic within the laboratory operation including sample tubes, sample cassettes, bleach bottles, chemical bottles and plastic packaging from lab supplies. All non-contaminated plastics are collected in 125-litre plastic bins lined with plastic bags. High density polyethylene plastic (HDPE) is collected separately from other plastics. The recycling service contractor picks up the plastics on a weekly basis and delivers them to a recycler.

Project Costs

Capital Costs: *$30,000 for solvent recycling system; other equipment purchases were part of regular improvements.*

Annual Operating Costs: *The operating costs of the solvent recycling system are minimal. The cost of the plastic, paper and corrugated cardboard recycling service is $600 per year.*

Revenues & Savings: *The cost of the solvent recycling system will be recovered over five years through reduced solvent purchases and solvent disposal costs; other reduction and recycling programs resulted in a 65% reduction in landfill disposal costs from 1989 to 1994.*

Stirrat Laboratories continues to recycle office paper, paperboard and corrugated cardboard. Office papers are collected in desk-side corrugated cardboard boxes and are taken to one of two 200-litre barrels in the office and photocopy areas. The barrel in the office area has a paper shredder mounted on the barrel lid for handling confidential materials.

Paperboard, primarily from individual packaging materials for lab supplies, is also collected in a 200-litre barrel. Corrugated cardboard is collected in a 1.5-cubic metre wooden bin.

All of the paper, cardboard and plastic collection containers are emptied weekly by a recycling service contractor for a cost of $50 per month.

These waste reduction and recycling efforts at Stirrat Laboratories have resulted in a 65% reduction in landfill disposal costs from 1989 to 1994. The recycling program adds about 5% to these costs, for a net savings of 60%.

Project Results

Stirrat Laboratories reports a 75% reduction in solvent purchases and disposal of waste solvent since installing the solvent recycling system. Quantities of other recycled materials are not tracked but are felt to have contributed to significant reductions in landfilled waste.

Reducing and Recycling Printing Waste

Raven Printing Ltd., Red Deer

Project Summary

Business Background: Raven Printing Ltd. is a family-owned printing business which specializes in printing forms, letterhead and business cards.

Project Description: Raven Printing Ltd. switched to a new developer solution which reduced waste developer by 75%. They also reuse excess and spoiled printing within the business and recycle corrugated cardboard.

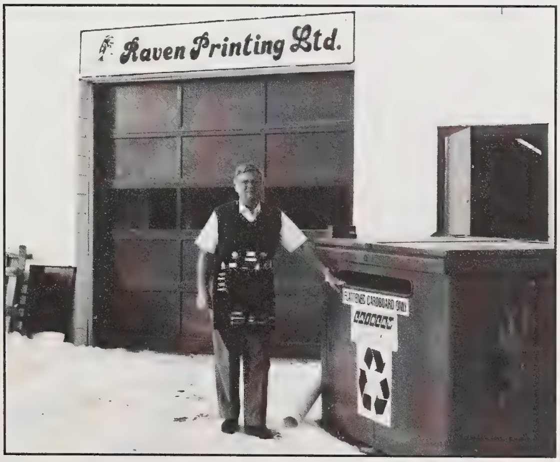
Business Background

Raven Printing Ltd. is a family-owned printing business which has operated in Red Deer since 1979. The business operates in a 550-square metre facility and has 16 employees, several of whom are Raven family members. The business specializes in printing forms, letterhead and business cards.

Project History

The owner/manager of Raven Printing has been active in environmental matters for a number of years. He has been involved in both Ducks Unlimited and in a local non-profit recycling organization in Red Deer. The owner has always been concerned about the impact of his business on the environment, the health of his employees, his neighbours and the long term viability of the business. Raven Printing will be moving to a new, larger facility in 1996, and the owner does not want to leave any environmental problems behind at their present location.

Interest in reducing and recycling wastes from the printing business began in 1990 when all of the employees of Raven Printing completed a Workplace Hazardous Materials Information System (WHMIS) training course. Following this course, the employees were more aware of the hazards associated with certain materials and they began looking for better ways to deal with these materials.



Corrugated cardboard is flattened and placed in a 2-cubic metre recycling bin provided by Raven Printing's waste hauler.

Project Description

Since 1990, Raven Printing has developed ways to reduce or recycle many of the materials used in the printing business. They switched to a new developer solution which was less hazardous and which resulted in less waste than the developer which was used previously. With the previous developer, development times had to be carefully controlled to avoid overdeveloping. Overdevelopment resulted in wasted film and excess use of developer. The new rapid access developer has a longer usable life and may be left for long periods of time without overdevelopment problems.

While the new developer is more expensive, the amount of developer purchased per year has been reduced to 25% of the previous amount. This has also resulted in less used developer for disposal. All used developer solution is collected in a specially designed barrel and is picked by a hazardous waste disposal contractor. Approximately two to three 200-litre barrels of used developer are disposed of each year.

All waste ink, sludges and other chemicals are also collected in

Project Costs

Capital Costs: *No additional capital costs for waste minimization.*

Annual Operating Costs: *$16,000 per year for recycling, waste reduction and hazardous waste disposal, plus some additional staff time.*

Revenues & Savings: *$2,400 per year savings in disposal cost for used developer; $500 per year revenue from silver recovery; no revenues are received for the corrugated cardboard at this time.*

200-litre barrels for proper disposal by the hazardous waste contractor. Again, about two or three barrels of these materials are produced each year. The cost of disposing of both the developer and the ink sludges is $300 per barrel plus mileage charges which add about $200 to every two barrels collected.

All fixer, negatives, positive mechanical transfer (PMT) chemicals, PMT paper and printing plates are picked up by a recycler who extracts the silver from these materials. This generates a revenue of approximately $500 per year for Raven Printing but requires extra labour in preparing these materials for shipping.

Some of the corrugated cardboard boxes received at the facility are reused for shipping printed materials to customers. Raven Printing has not purchased any corrugated boxes for shipping for the past five years. The remaining cardboard boxes are flattened and placed in a 2-cubic metre recycling bin provided by Raven Printing's waste hauler. Raven Printing also has a 2-cubic metre bin for garbage. While the corrugated cardboard recycling service costs $60 per month, there is a savings by having a smaller garbage bin. The manager of Raven Printing estimates that the corrugated cardboard bin is emptied about once a week, resulting in approximately 13 tonnes of corrugated cardboard recycled each year.

Waste bristol board, which is a stiff paperboard material, is cut into 9.5 centimetre by 4.5 centimetre pieces and sold to taxi companies for use as trip tickets. The revenue received from the taxi companies covers the cost of preparing the tickets.

All excess or spoiled printing on bond, book and fine paper is reused as dividers to separate sections in the Red Deer Real Estate Board Listings which are printed weekly. The paper is cut to 22.25 centimetres by 14 centimetres and inserted to separate sections in the weekly printings. The Real Estate Board and some other customers also return outdated printed materials for use as dividers. Some soft papers and brown kraft papers are reused as packing material for customers' orders.

In many areas of their business, Raven Printing has switched to environmentally friendly, biodegradable cleaning products. Alcohol is currently added to balance the pH of the fountain solution, which cleans the printing plates. Raven Printing expects to eliminate the use of alcohol by 1996 by using alternative chemicals. Currently, almost all printing done at the facility uses vegetable based inks and 70% of the printing is done on recycled paper.

Rags used to clean equipment were once purchased and thrown away when dirty. The rags are now supplied and laundered by a linen supply company. This service costs approximately $100 per month. Used oil from the printing presses, amounting to a few litres per year, is taken to a community recycling depot. Used wooden pallets are placed in a collection area, along with pallets from other businesses in the same building, and are picked up by a pallet recycler.

Raven Printing's costs for these recycling, waste reduction and hazardous waste disposal programs are approximately $16,000 per year. The manager of Raven Printing sees these expenses as just part of doing business in an environmentally responsible manner. Raven Printing estimates that they have reduced their quantity of solid waste by 35% through these waste reduction and recycling efforts.

Project Results

Raven Printing has achieved a 75% reduction in the amount of developer used and disposed of as hazardous waste. They recycle 13 tonnes of corrugated cardboard each year. The manager estimates that their waste reduction and recycling efforts have reduced solid waste by 35%.

Reducing and Recycling Automotive Wastes

Mills Nissan, Edmonton

Project Summary

Business Background: Mills Nissan is a new car dealership and service business which has been operating in south Edmonton since 1987. The business includes eight service bays and employs approximately 20 people.

Project Description: Mills Nissan recycles corrugated cardboard, metals, plastics and oil from its vehicle maintenance operations. They have also taken steps to reduce office paper usage and to recycle office papers.

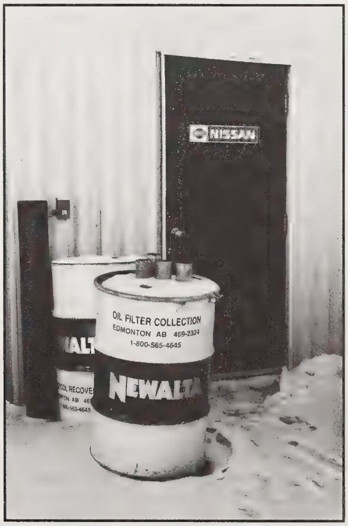
Business Background

Mills Nissan is a new car dealership and service business which has been operating in south Edmonton since 1987. The business includes eight service bays and employs 20 people.

Project History

Waste disposal at Mills Nissan was traditionally the responsibility of the service manager. While aware that waste costs were not being monitored closely, the service manager had little time to research alternatives and negotiate waste service contracts.

In 1991, the new owner of Mills Nissan was concerned about the high cost of waste disposal. The owner recognized that the office manager had access to purchasing data and had time to spend on finding waste management solutions. The staff were also interested in incorporating environmental responsibility into their daily activities. In fact, a number of the waste practices now in place were initiated by staff with a concern about the amount of material being thrown into waste containers.



Used oil filters are collected in 200-litre drums and sent to a recycler.

While used oil and batteries had always been stored for recycling at Mills Nissan, the office manager made a series of phone calls to identify options for other materials such as oil filters, corrugated cardboard, antifreeze, metals, plastic jugs and paper. With the cooperation of the service department and other staff, these materials are no longer going to landfill and a policy of purchasing recycled materials and biodegradable cleaners has also been established.

The waste minimization activities at Mills Nissan have been put in place gradually over a number of years and are now part of the normal routine for staff who are committed to making programs work and offering suggestions for improvement.

The largest problem faced in establishing the various practices was being confident that a recycling option would be consistently available. Mills Nissan's office manager feels that this is not as much of a problem now since the waste management sector has stabilized in recent years.

Project Costs

Capital Costs: *Minimal additional capital costs have been required to implement the waste minimization program.*

Annual Operating Costs: *Approximately $2,256 per year for servicing of waste bin and corrugated cardboard recycling bin; variable charges for recycling other materials.*

Revenues & Savings: *$2,088 reduction in annual waste reduction in annual waste disposal costs. Revenue generated by an environmental fee added to customers' invoices is applied to the cost of collecting oil, oil filters, antifreeze and tires for recycling.*

Project Description

Most waste handling at Mills Nissan requires no extra effort other than to place materials into the proper bins. Two 4-cubic metre bins for collecting corrugated cardboard and metals are located behind the service bays within a fenced compound, along with a 3-cubic metre waste bin. The employees deposit materials in these bins as they go about their usual duties. The metal bin is collected only when it is full. This is usually two or three times per year. The cardboard and general waste bins are collected on a regular schedule.

Empty plastic antifreeze and windshield washer jugs are collected in a large box inside the service area. When this box is full, it is taken by an employee to a community recycling depot where permission was obtained to place the jugs into the appropriate bin.

Used oil is drained into a 2,500-litre fibreglass underground storage tank and pumped out by a recycling contractor for a fee. About 450 litres of used oil are generated each week along with about 45 used oil filters. The used oil filters are placed into a 200-litre drum which is collected for recycling when it becomes full.

Mills Nissan uses a large amount of computer paper in their accounting and inventory record keeping. The cost of this paper has risen over recent years from $18 per 3,500 sheets to $45 for 3,000 sheets. The office manager now searches for the least expensive source for each purchase and both sides of the paper are now used. Through careful use of paper and printing on the back side of outdated reports, paper purchases have been reduced by 60%.

Desk-side floor baskets were once used as a means of collecting other office papers for recycling. It was found that these became contaminated with other wastes. Staff now bring office paper to a 200-litre bin within the office area. This bin is emptied into a larger bin in a general storage area. When approximately one tonne of paper is collected, a recycling service picks up the paper for no charge. It takes about one year to collect one tonne of office paper. Some used office paper is also available to employees for their own use.

A variety of other practices are being applied to reuse paper and reduce the need for purchasing unnecessary paper and associated supplies. One of these includes using binders instead of standard file folders. The binders resist wear from frequent access to files and eliminate the need for bankers boxes to store files. When the binder contents are out of date, the binder can be reused for new files.

Other practices include switching to two-sided forms for inventory records, switching to biodegradable cleaners for many cleaning tasks and saving the plastic cores from calculator tapes for donation as day care craft supplies. While most corrugated cardboard, generated from supplies packaging, is sent for recycling, some parts boxes are kept on hand for reuse in shipping supplies to clients or other dealerships. This has eliminated the need to purchase packaging. Future plans include upgrades to the computer system to reduce the amount of printing required and to reduce the need for paper documents. Some interest has been shown in establishing a system which uses bulk window washer rather than generating large amounts of plastic jugs.

Prior to initiating waste minimization as part of the daily business routine, Mills Nissan was paying $362 per month to have its waste bin emptied three times per week. The waste bin is now emptied only twice per week, along with the bin for recyclable cardboard. The cost of the service is now only $188 per month which includes a $45 per month service charge to have the cardboard bin delivered to a recycler. Overall, the waste minimization program has resulted in a savings of $2,088 per year in waste disposal costs.

The significant savings in solid waste disposal costs do not cover the collection cost of oil, oil filters, antifreeze, metal and tires for recycling. The owners of Mills Nissan are supportive of the environmental efforts but do not want the costs to become prohibitive. Therefore, Mills Nissan has implemented a 10% environmental service charge added to customer invoices. The service department staff find that customers are supportive of this charge when they are aware of the environmental programs it supports. In fact, many customers feel good about having their car serviced in an environmentally conscious business and are more likely to return rather than reject the fee.

Project Results

Mills Nissan recycles approximately 450 litres of used oil, 45 used oil filters and 4-cubic metres of flattened corrugated cardboard per week. Office paper consumption has been reduced by 60%.

Reducing and Recycling Manufacturing Wastes

Northern Telecom, Calgary

Project Summary

Business Background: Northern Telecom's Multimedia Communication Systems (MCS) plant in Calgary employs 1,400 people and produces telephones and other small business communication equipment.

Project Description: Northern Telecom worked with suppliers to reduce packaging materials and to use returnable shipping containers. They have made technology changes which reduce the wastes, including hazardous wastes, generated in the manufacturing of circuit boards. A recycling program collects eight different materials.

Business Background

Northern Telecom operates two manufacturing and assembly plants in Calgary employing 2,400 people. The Multimedia Communication Systems (MCS) plant employs 1,400 people and produces telephones and other small business communication equipment.

Project History

Waste minimization programs began receiving significant attention at Northern Telecom in 1990 when the company published waste minimization guidelines for all of its plants based on a Calgary case study. The company's waste management objectives were to protect the environment, maintain plant operating efficiency and deal with rising waste handling costs. They set an objective of a 50% reduction in wastes going to landfill by the year 2000, based on 1993 levels.

In the early 1990s, the Calgary MCS plant had a problem with large amounts of packaging from incoming supplies and other materials occupying floor space in the plant. This was both a materials handling problem as well as a disposal cost problem. A rise in landfill tipping fees from $9 per tonne in 1990 to $30 per tonne in 1995 reinforced the need to minimize these materials and reduce disposal costs.

Early programs at the plant included paper and corrugated cardboard recycling. A baler was installed to assist with cardboard recycling. Since 1990, more materials have been added to the program and eight materials are now separated from the waste stream.

Environment committees have been established in the Northern Telecom plants to plan and monitor waste minimization and other environmental efforts. These committees typically include a production manager, product line manager, chemical handlers and other employees with an interest in environmental matters.

While participation began slowly in the early years, the recycling programs have become more routine. With experience, recycling bins have been placed in convenient locations on the plant floor with easy access for employees to drop off materials.

Project Description

The waste minimization program at the Calgary MCS plant is typical of many Northern Telecom plants. Materials are collected close to where the waste is generated and in a way which is convenient for the employees.

At the Calgary MCS plant, bins for paper and corrugated cardboard, and for plastics, are placed throughout the plant in locations which are practical for the employees. Most of the 1.5-

Pallets are collected for reuse and recycling at Northern Telecom's MCS plant in Calgary.

cubic metre bins are clearly marked as recycling bins. The bins are mounted on wheels in order that they can be easily moved to loading bays for collection by recyclers. In the office area, each office has a 14-litre blue box for office papers. These boxes are emptied into 1.5-cubic metre wire cages located in a convenient area of the office floor.

Damaged and non-standard pallets are separated and placed outdoors in a fenced compound. These are collected by a pallet repair and recycling firm. Repaired pallets which are compatible with Northern Telecom's storage system are purchased back from the recycler for $5 less than the price of new pallets.

The Calgary MCS plant produces a wide variety of plastic wastes and trimmings from their products as well as receiving plastic packaging trays, foam and packing peanuts with incoming supplies. Plastic produced in the manufacturing process is collected unsorted in bins on the production floor. The bins of plastic are collected by a recycler two to three times per week.

The packaging waste problem is also being addressed by developing partnerships with suppliers to reduce the amount of packaging used and to use returnable shipping containers. This initiative is supported by a company-wide packaging council which tries to address the issue on a larger scale.

To reduce packaging wastes, bulk collapsible shipping crates and reusable plastic parts trays have replaced some corrugated cardboard boxes and disposable parts trays. One type of shipping crate now commonly used collapses to one-third of its size and is returned to the supplier complete with the foam packing material it contained. It is estimated that combined with returnable parts trays, $100,000 per year in packaging costs are being saved by the reusable packaging program.

Foam packaging materials are generated in large amounts and most cannot be returned to suppliers. While some limited markets for used foam have been found in small local businesses, this foam waste remains a waste minimization problem for the plant. Efforts continue to encourage suppliers to minimize the amount of foam and peanuts they need to ship supplies. A similar philosophy is being applied as Northern Telecom works to reduce the amount of packaging used for shipping its own final products.

Northern Telecom believes that reducing the use of hazardous chemicals is an important part of their waste reduction program. All new chemicals which are used in the plant must go through a chemical approval process. This process involves the environmental and safety committee and includes consideration of waste management factors as well as environmental and health hazards. To ensure that inappropriate chemical supplies are not ordered, the purchasing department has a list of the approved chemicals.

In order to reduce both material consumption and use of hazardous substances, a number of technology and process changes have been incorporated into the Calgary MCS plant. In the past, there have been concerns with the quantities and hazards associated with spent solder, spent cleaning solutions and volatile organic compounds generated during the production of circuit boards.

Equipment changes have been made to allow the soldering operations to take place in an inert nitrogen atmosphere. This reduces the amount of waste solder dross by 90% compared to the amount created in a normal atmosphere. In addition, solder flux is now applied by spray, rather than by a bath system, which greatly reduces the amount of flux required and the amount of flux lost to evaporation. While the spray technology is costly, the reduced flux costs justify the expense.

The strong solvents used to wash circuit stencils, which including ozone depleting substances, have been eliminated by switching to alcohol based solvents.

Any solder dross generated is collected in 16-litre metal pails. Full pails are stored in the warehouse area of the plant until enough is accumulated to be shipped to a recycler. The recycler is also a supplier of new solder and a credit is given on new supplies in exchange for the salvaged dross.

Other metals are collected for recycling. Clipped wire leads are collected for recycling. Aerosol cans are properly packed in 205-litre drums and sent for recycling. While lead acid batteries have been used in the past for emergency lighting purposes, the plant recently switched to gel cells and arranged for a recycler to collect the old batteries.

Project Costs

Capital Costs: *Unspecified cost in manufacturing process equipment changes; $13,300 for a baler; $2,500 for blue boxes for offices; approximately $2,000 for other collection bins.*

Annual Operating Costs: *Operating costs for the waste minimization program are integrated into normal plant operating costs.*

Revenues & Savings: *$86,064 in 1994, including $56,881 in revenues from the sale of recyclable materials and $29,183 savings in landfill disposal costs.*

Waste minimization practices have been implemented in other parts of the plant. Empty laser toner cartridges are collected in the office area and returned to be refilled. The cafeteria sends cooking oils to a rendering plant and beverage containers are collected for recycling. A company secretary placed a message on the plant electronic mail system indicating that she would collect used plastic overhead transparencies to ensure that they are recycled. Grounds maintenance personnel maintain a small compost pile for grass clippings from the plant's lawn maintenance.

All of the waste minimization practices at the Calgary MCS plant are based on the needs of the site and a desire to make it convenient for staff to participate. Little formal employee training in waste minimization has been required other than on-the-job instruction. Posters at various locations around the plant offer information on proper practices and encourage employee participation.

The management encourages suggestions from employees to improve the waste minimization program. The employees are committed to waste minimization and would be disappointed if any of the existing programs were discontinued.

Upper management has also supported the program by allowing any revenues from the sale of recyclables to be used to finance further improvements to the waste minimization program. To date, these funds have been used to purchase blue boxes at a cost of $2,500 and other collection bins used in the program at a cost of approximately $2,000. The funds have also been used to support a university student using the plant as a case study.

The operating costs for the waste minimization program are integrated into the regular operating costs for the plant. However, Northern Telecom has developed a tracking system for the direct costs, revenues, avoided disposal costs and quantities of materials associated with its waste minimization program.

As a result of their efforts in 1994, the MCS plant collected 416.4 tonnes of materials for recycling. This includes 304.4 tonnes of corrugated cardboard, 20.3 tonnes of paper, 11.3 tonnes of solder dross, 5.2 tonnes of metal including wire clippings and cans, 35.3 tonnes of wood pallets, 36.5 tonnes of plastics and 3.4 tonnes of other materials.

The total waste generated including recyclables has increased 41.5% from 1992 to 1994 due to growth in the plant operation. During this time, the amount of waste going to landfill has remained relatively steady while the amount of material recycled has increased by 215%. In 1994, recycled materials accounted for 49% of total wastes while 51% of wastes were landfilled. This is a significant improvement over 1992 when recyclables represented 22% and landfilled materials were 78% of total wastes.

In 1994, the program resulted in $86,064 in revenues and avoided costs including $56,881 generated from the sale of recyclables and $29,183 in avoided landfill disposal costs.

Northern Telecom is pleased with the recycling success of the Calgary MCS plant. However, the long term goal is to recycle less by reducing waste generation. Northern Telecom remains committed to reducing the use of raw materials and increasing reuse of materials. To assist in reaching this goal, the company has designed a corporate environmental information data base to track their progress each year.

Project Results

The amount of material recycled at Northern Telecom's MCS plant has increased by 215% from 1992 to 1994. In 1994, 49% of the wastes produced at the plant were recycled compared to 22% in 1992. In 1994, 416.4 tonnes of materials, dominated by corrugated cardboard, were collected for recycling.

Reusing and Recycling Paper Wastes

PNG Globe Envelopes, Edmonton

Project Summary

Business Background: PNG Globe Envelopes is a national manufacturer and distributor of paper envelopes. The Edmonton plant produces custom-printed envelopes and acts as a distribution centre for stock envelopes.

Project Description: PNG Globe Envelopes reuses paper, misprinted envelopes and corrugated cardboard within their operation whenever possible. Envelope trimmings and other paper products are recycled.

Business Background

PNG Globe Envelopes is a national manufacturer and distributor of paper envelopes. The 3,345-square metre Edmonton plant is one of eight PNG Globe Envelopes plants in Canada. The Edmonton plant, with nine employees, specializes in small volume, quick turn-around orders of less than 50,000 envelopes. Larger orders are normally printed on high speed printers at other PNG Globe Envelopes locations.

The Edmonton plant also acts as a distribution point for stock envelopes. Of the orders processed through the Edmonton plant, approximately 30% are for custom-printed envelopes and 70% are for stock envelopes.

Project History

The envelope manufacturing industry has a long history of recycling. The trimmings from the envelope manufacturing process have been a traditional source of high quality paper for recycling.

PNG Globe Envelopes has been part of this recycling tradition and for the past several years have also recycled corrugated cardboard and other paper products. More recently, the cost of paper products has lead PNG Globe Envelopes to find innovative ways to reuse and recycle a wide range of paper products.

The general manager of the Edmonton plant has a strong personal interest in waste minimization and has encouraged the plant employees to identify and implement waste minimization opportunities.

Project Description

During the envelope manufacturing process, the paper stock is cut to the correct pattern using metal dies. All of the envelope trimmings are collected in small corrugated cardboard boxes placed at the cutting and folding equipment. The trimmings are then gathered in 1-cubic metre wire cages for shipping to a recycled paper broker.

The envelope manufacturing industry has been a traditional source of high quality paper for recycling.

Project Costs

Capital Costs: No additional capital costs to implement waste minimization program.

Annual Operating Costs: No additional annual operating costs to implement waste minimization program.

Revenues & Savings: Approximately $39,000 per year in revenue from sale of recyclable materials. Unspecified savings in reduced waste disposal costs.

Window chips, which are small rectangles of paper cut out of the envelope in order to insert plastic windows, are also collected. Some are reused as inserts to divide envelopes in their shipping boxes. The remainder are sent for recycling.

The wire cages are supplied by the recycled paper broker and are picked up on a weekly basis. The plant ships just over one tonne of trimmings each week and currently receives about $730 per tonne for this clean white paper.

During the printing of custom envelopes, a few envelopes are used at the start of each print run to adjust and align the printing press. Off-specification and misprinted envelopes are used for this alignment process. Also, envelopes are reused in the set-up process several times before they are recycled. Any excess misprinted or off-specification envelopes are also recycled.

The metal plates used for printing envelopes are saved and reused if the order is for a repeat customer. Any metal plates which are not reusable are collected and sent to a metal recycler. This amounts to approximately 90 kilograms of metal each year and yields about $60 per year in revenue.

Non-alcohol cleaners are used for cleaning the printing presses. Also, cloth rags rather than paper towels are used for equipment cleaning. The cloth rags, as well as coveralls and aprons, are supplied by a linen supply company.

Glues for the envelopes are received in 200-litre metal drums. The empty drums are sold to a recycler for $6 per drum.

PNG Globe Envelopes has several reuse options for corrugated cardboard which arrives at the plant. Many of the corrugated cardboard boxes are reused to ship envelopes to customers. Others are reused in-house to collect paper trimmings. Corrugated cardboard inserts received in boxes of stock envelopes are reused to divide envelopes in customers' orders.

PNG Globe Envelopes has a corrugated box reuse program with several of its customers. PNG Globe Envelopes will purchase their boxes back from customers for a nominal fee which is less than the cost of a new box. The reused corrugated cardboard boxes can often make four or five trips before they are recycled.

Any corrugated cardboard which cannot be reused is recycled through the same paper broker who takes the envelope trimmings. PNG Globe Envelopes ships about 180 kilograms of used corrugated cardboard each week and receives $140 per tonne for this material.

Many of the paper products used at the plant are received on wooden pallets. Some of these pallets are reused to ship products to customers. Excess pallets are sorted by size and are returned to the suppliers or are picked up by an auto parts supply company for reuse. Some customers also return pallets to the plant for reuse.

Some of the shrink wrap plastic received at the plant is reused as packing material, but much of it ends up as garbage.

As a result of their emphasis on reuse and recycling, PNG Globe Envelopes have been able to reduce their garbage pick-ups over the past two to three years. They now have one pick-up of a 6-cubic metre garbage bin every two weeks. Prior to their waste minimization efforts, pallets and corrugated cardboard were the biggest components of their garbage. The contents of the bin are now primarily plastic shrink wrap and non-recyclable materials.

Project Results

PNG Globe Envelopes recycles approximately 55 tonnes of paper and 9 tonnes of corrugated cardboard from its Edmonton plant each year. Since implementing their reuse and recycling program, PNG Globe Envelopes has reduced its garbage bin pick-up from once or twice a week, to once every two weeks.

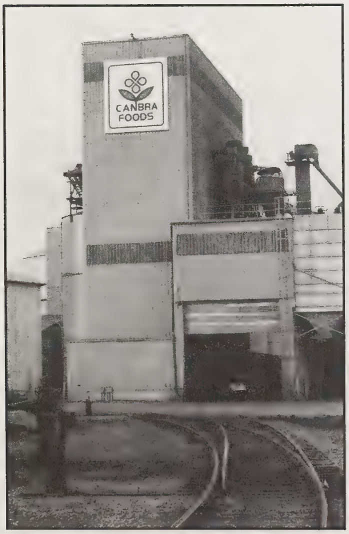
Reusing and Recycling Food Processing Byproducts

Canbra Foods, Lethbridge

Project Summary

Business Background: Canbra Foods processes canola seed to produce a variety of food products such as margarine and cooking oil. The plant in Lethbridge employs 245 people.

Project Description: Canbra Foods made process changes which allowed them to find alternate, revenue-generating uses for the major byproducts from canola processing. They are also recycling corrugated cardboard and plastics.



Canbra Foods in Lethbridge has achieved a 98% reduction in waste generation plus exceptional cost savings.

Business Background

Canbra Foods processes canola seed to produce a variety of food products such as margarine and cooking oil. The plant, which employs 245 people, is located in an industrial district of Lethbridge along with a variety of other food processing businesses.

Project History

In 1989, Canbra's superintendent of seed plant and waste management recognized that the company was spending $175,000 per year to dispose of its wastes. At the same time, it was clear that new regulations would soon prevent traditional landfill disposal for some of these wastes. The superintendent of seed plant and waste management set out to investigate the reason for this large expenditure and to implement practices which might reduce waste related costs.

By examining the waste handling system, some obvious problems were identified including too many collection bins, partially full bins being collected for disposal and apparently recyclable materials going to landfill. The superintendent of seed plant and waste management took on the task of resolving this waste problem in his spare time. While many doubted his ability to find economically viable alternatives to traditional industry waste management practices, he was allowed to keep control of funds generated from recyclables to finance any capital expenditures required.

Project Description

The major byproducts generated by Canbra's canola processing include 4,500 tonnes of bleaching clay, 3,200 tonnes of waste canola oil and 204 tonnes of nickel catalyst per year, as well as various amounts of computer paper, plastics and metal drums. In 1989, much of this material was being placed in several waste bins located throughout the plant or in a large tanker truck. This material was disposed of at the Lethbridge regional landfill.

The first waste management step was to stop contracting out waste handling services and to take direct control of waste management. This was immediately followed by drastically reducing the number of bins and ensuring the remaining bins were emptied only when they were full. This approach had the immediate effect of reducing collection fees as well as tipping fees. Canbra also began collecting paper and corrugated cardboard for recycling.

The next step was to examine the byproducts being produced to see if alternatives to landfill disposal could be found. After some research and testing of technological changes in the plant, a variety of solutions were found. Nickel catalyst is now being more efficiently reclaimed from the process and sold to a variety of markets. Canbra avoids long-term contracts for nickel catalyst in order to take advantage of the best spot prices being offered by any one market.

Project Costs

Capital Costs: *$8,000 for used grain trucks and $4,000 for a cardboard and paper compactor.*

Annual Operating Costs: *Waste minimization activities have been integrated with normal plant operation costs.*

Revenues & Savings: *$175,000 reduction in waste disposal costs; unspecified revenues from the sale of recyclable materials.*

The bleaching clay is now being used to produce a new product and the waste canola oil is being sold for use in feed production. Arrangements have been made with some users of canola oil, such as potato chip producers, to return used canola oil to Canbra at no cost. Canbra then reclaims the oils to be sold as an animal feed additive. Even canola oil from spills or plant interruptions can be reprocessed and sold to these secondary uses. A secondary benefit of recovering the marketable byproducts is that effluent from the plant now averages less than half of the maximum contaminant limits allowed by provincial regulation.

The plant also recovers and processes canola seed chaff and processes it into animal feed pellets as well as occasionally offering chaff to a local private composting business. Previously, this chaff went to the landfill. Loads of spoiled seed which arrive at the plant are offered to Ducks Unlimited and the Coaldale birds of prey centre.

Corrugated cardboard and computer paper continue to be segregated from other wastes to protect their quality and are sold to a recycling broker. Three to four hundred metal drums are sold each year for reuse and a wash system has been installed in order that plastic pails may be washed and taken to a recycling broker. Environmentally sensitive cleaners are now used in the plant to replace petroleum-based solvents and alternative lubricants are being tested in plant equipment with good results.

The project has been so successful in demonstrating how waste management can solve financial and environmental problems that many industries in Lethbridge are looking to Canbra's example for ideas in their own operations. The superintendent of seed plant and waste management is often invited to consult with other businesses and offer advice on how they may reduce waste and save disposal costs. Because the principles of waste management are transferable, this advice is extended beyond the food processing industry to other businesses such as modular home manufacturing. To broaden awareness of the importance of waste management, the plant supervisor also offers plant tours to schools as well as corporate and municipal groups. Attempts are being made to get local industry representatives to meet regularly to discuss common waste problems and solutions.

The Canbra program is entirely self-funding and required no additional capital to become established. Approximately $8,000 was spent for used grain trucks to transport the byproducts to their respective new markets, but this money was generated from the sale of the initial recyclables recovered from the waste stream. A paper and cardboard compactor was also purchased for about $4,000, but is no longer necessary since these products can now be delivered loose to the recycler.

As a result of one person's initial efforts, Canbra's plant has reduced its waste going to landfill by 98%. Waste disposal costs have been reduced by $175,000 per year while revenue is generated from the sale of byproducts previously considered as waste. The savings achieved through the waste minimization program are now considered a normal part of the business. Future success in waste reduction will be measured against the high standard quickly established by the initial program.

Project Results

Canbra Foods has implemented recycling or found alternate uses for 4,500 tonnes of bleaching clay, 3,200 tonnes of waste canola oil, 204 tonnes of nickel catalyst and large quantities of seed chaff each year. These and other recycling efforts have resulted in a 98% reduction in waste going to landfill.

Recycling Office Paper

HomeLife/Allan Realty Services Ltd., Edmonton

Project Summary

Business Background: HomeLife/Allan Realty Services Ltd. is an Edmonton real estate office employing 20 to 25 realtors and 5 support staff.

Project Description: Following advice from the City of Edmonton, HomeLife/Allan Realty Services Ltd. implemented a program to reduce photocopy paper use and to recycle office paper.

Business Background

HomeLife/Allan Realty Services Ltd. is an independently-owned real estate office which is part of the HomeLife national realty chain. The office has been in business for eight years, although the owner has worked in the real estate field for over 20 years. This office employs 20 to 25 realtors and five support staff.

Project History

Beginning in the early 1990s, the staff at Allan Realty were aware that they were producing large quantities of waste paper and began to look for ways to reduce that waste. They initially contacted some commercial office recycling services but found that either the cost was too high or the services were not interested in the quantity of paper produced from a small business.

Some of the staff were aware of locations around Edmonton where office paper could be dropped off for recycling and they began to do this on their own time, using their own vehicles. When the City of Edmonton established drop-off depots for office paper, the staff began to deliver the paper to those depots. However, the handling and delivery of office paper to the depots was time consuming and not without risks. One office staff person was injured while delivering the paper for recycling.

In the spring of 1993, the City of Edmonton approached Allan Realty regarding a pilot waste reduction project. The City provided paper bins, collected the paper and monitored the results for a three-month period. Through this study, the City identified that Allan Realty could reduce their solid wastes by 75% through paper recycling. At the end of the study, the City recommended that Allan Realty either purchase some bins and continue to self-deliver the paper or contract with a commercial recycling service. The City provided the names of some recycling services who were prepared to deal with smaller businesses. As a result of the City's suggestions, Allan Realty was able to find a contractor who would provide a recycling service at a reasonable cost.

Multiple listing service catalogues form a large part of HomeLife/ Allan Realty's recyclable office paper.

Project Description

The City of Edmonton study found that a large proportion of Allan Realty's office waste was recyclable paper. In particular, each realtor received a multiple listing service catalogue every two weeks and these catalogues formed a large proportion of the waste. In addition, the office produced significant quantities of general office paper, newspapers and magazines.

All of these papers are now collected in desk-side containers at each desk in the office. The janitorial staff empties the desk-side containers into two 175-litre wheeled toter bins twice a week. The toters are provided as part of the contract with the recycling service. Also, the office staff and realtors deliver materials directly to the toters if their desk-side bin is full or if they have large quantities of materials.

The toter bins are emptied every two weeks by the recycling service at a cost of $8.75 per bin per pick-up or about $455 per year. It is estimated that about 2.5 tonnes of paper are recycled each year.

Allan Realty has also made a number of changes which result in less paper being used. Office paper which has only been printed on one side is reused to print out real estate listings on the laser printer, to print fax cover sheets or as note paper. Two-sided photocopying is used whenever feasible.

Previously, new listings were photocopied and distributed to every realtor in the office. Many of these photocopies were simply read and discarded. Now, only one copy of each new listing is made and is posted on a bulletin board. Realtors make additional copies on an as-needed basis.

In addition to reducing and recycling office papers, Allan Realty has reduced waste by using linen towels instead of paper towels in the washrooms and by recycling beverage cans and bottles.

Because all of their garbage is removed from the office by the janitorial contractor, Allan Realty has not had any direct savings in waste disposal costs as a result of their waste reduction efforts. However, they are producing some savings in paper purchases and are satisfied that their office paper is being recycled rather than landfilled.

Project Costs

Capital Costs: *None; equipment provided by recycling service contractor.*

Annual Operating Costs: *$455 per year for recycling service.*

Revenues & Savings: *Unspecified savings in purchase of photocopy paper. No revenues are received for the recycled materials at this time. There are potential future savings in waste disposal costs.*

Project Results

HomeLife/Allan Realty Services Ltd. collects approximately 2.5 tonnes of office paper for recycling each year.

Recycling Paper Products

Car Care Automotive Supply, Edmonton

Project Summary

Business Background: Car Care Automotive Supply is an automotive parts store providing parts for automotive, heavy duty, agricultural and industrial applications. Nine people are employed in the sales, delivery, inventory and retail aspects of the operation.

Project Description: Office paper, parts catalogues and corrugated cardboard are recycled. Used parts catalogues are collected from customers and returned to the business for recycling.

Numerous parts catalogues, continually updated for customers, are collected and recycled.

Business Background

Car Care Automotive Supply is an automotive parts store supplying parts for automotive, heavy duty, agricultural and industrial applications. The business was started in 1972 and moved into its present location in late 1991, doubling their floor space to 650 square metres. The single store serves as a retail outlet and base of operation for delivery services to customers in Edmonton and a region which extends from Wainwright to Bonnyville and Mayerthorpe. Nine people are employed in the sales, delivery, inventory and retail aspects of the operation. The business operates five vehicles.

Project History

Car Care was contacted by a commercial waste auditor from the City of Edmonton early in 1992. Believing that waste reduction was the environmentally responsible thing to do, Car Care followed up with a series of meetings in which the auditor provided information on waste reduction strategies and recycling programs. The major waste problems in the business were the large quantities of corrugated cardboard and outdated parts catalogues generated on a continuous basis.

Project Description

The waste materials generated at Car Care are dominated by computer paper, corrugated cardboard and the large number of parts manuals which must be replaced each year. All of the used computer paper is saved and the reverse side is used as order-taking paper. Once the paper has been used on both sides, it is collected in a 175-litre plastic bin located in the order area. When the bin is full, it is picked up by a local company which shreds and recycles the paper. Outdated parts catalogues are also saved to be recycled by the same company.

Large amounts of corrugated cardboard are generated on a daily basis as stock orders arrive. Some of the boxes are reused to ship orders to out-of-town customers. When Car Care's sales representative calls on customers, empty boxes are collected and returned to the Edmonton shop to be refilled with new orders. Any cardboard which cannot be reused for shipping is stored in a 5-cubic metre wood and wire bin in the stock storage area. Approximately 50 kilograms of cardboard are collected in this bin each month. When the bin is full, the cardboard is delivered to a recycling company by Car Care delivery trucks on their normal routes in the city.

In order to extend waste minimization beyond the major waste streams, a number of other practices have been implemented. Glass coffee cups are provided in the store for customers and staff, instead of disposable styrofoam cups. Company vehicles are serviced in a small garage bay at the rear of the store and used engine oils and filters are collected for pick up by oil recyclers. A small number of paint cans are generated in the business. These containers are allowed to air dry and are delivered to the City's hazardous waste depot. Used lead-acid batteries are accepted from customers and returned to recyclers.

Car Care encourages customers to minimize waste and offers a number of products such as oil filter crushers as well as equipment for recycling air conditioning gases and coolant. During sales calls, the sales representatives will bring customers' outdated parts catalogues back for recycling through the Car Care recycling program. Some customers return their entire catalogue racks to the Car Care shop where the catalogues are updated and old copies are saved for recycling. Including their own paper and customer catalogues, approximately 68 kilograms of paper are collected for recycling each month.

The waste reduction practices introduced at Car Care require very little extra effort by staff. The staff have been willing to get involved and find the measures easy to incorporate into their regular duties. The only minor problem with the waste minimization program is the space occupied by the cardboard storage bin in the stock area.

It is estimated that Car Care has reduced their overall waste generation by 60%. This reduction has not resulted in a reduction of disposal costs since Car Care does not pay for their waste disposal service. Their waste bin is shared with a neighbour who pays for the bin and collection service in exchange for Car Care providing space for the bin and parking spaces in their lot. The fee for the paper recycling service is minimal and is offset by the $6.50 per month received from the cardboard recycling and the $1.50 received from each battery returned for recycling. There are minimal monetary benefits to Car Care for their waste minimization effort. However, any costs incurred are justified by knowing that useful resources are being diverted from landfills.

Car Care is strongly supportive of the City of Edmonton's environmental program and is looking forward to the opening of a recycling depot in their area which will handle a wide variety of recyclables as well as a limited volume of hazardous goods. In the future, Car Care would also like to set up a used oil depot at their shop as a service to the surrounding residential neighbourhood but are finding that the regulatory hurdles are too difficult at present.

Project Costs

Capital Costs: *Less than $100.*

Annual Operating Costs: *Not specified.*

Revenues & Savings: *$78 per year in revenues from the sale of corrugated cardboard.*

Project Results

Car Care has reduced their waste generation by 60%.

Recycling Corrugated Cardboard

Grand & Toy, Edmonton

Project Summary

Business Background: Grand & Toy distributes stationery and office products to retail stores and commercial customers from its Branch Distribution Centre in Edmonton.

Project Description: Grand & Toy reuses corrugated cardboard trays and boxes for packing orders, and bales excess corrugated cardboard for recycling.

Corrugated cardboard is baled in vertical down-stroke baler and shipped for recycling.

Business Background

Grand & Toy is a national retailer of stationery and office products. The Branch Distribution Centre in Edmonton supplies three retail stores in the Edmonton area and ships over 800 orders per day directly to commercial customers in Alberta and the Northwest Territories. The Branch Distribution Centre has been in operation since 1974 and has 60 employees. Grand & Toy announced in early 1995 that it was consolidating its warehousing operations in Calgary. However, the Edmonton centre will continue to have distribution and retail operations.

Project History

In the late 1980s, Grand & Toy was taking steps to make their operations more environmentally friendly. With increasing environmental awareness, the employees of the Edmonton Branch Distribution Centre began identifying waste reduction opportunities within their warehouse.

At this time, the warehouse manager saw an article in a company newsletter describing the installation of a baler as part of a corrugated cardboard recycling program at Grand & Toy's Ontario distribution centre. The manager did a cost analysis and found that a corrugated cardboard recycling program could be justified at the Edmonton distribution centre as well. A baler was purchased and the cardboard recycling program began in 1990.

Employees at the warehouse also looked for waste reduction opportunities in other areas. The City of Edmonton was invited to conduct a waste audit of the warehouse and they provided additional ideas for waste reduction. While the warehouse manager has been responsible for the overall management of the waste reduction program, the employees have been involved in planning the operation of the program and the placement of the collection containers.

Project Description

With the installation of the vertical down-stroke baler in 1990, Grand & Toy began its corrugated cardboard recycling program. The Edmonton Branch Distribution Centre receives most of its products, from suppliers and a Grand & Toy distribution centre in Ontario, in corrugated cardboard boxes. When received, most products are taken from the cardboard boxes and placed on shelving in the warehouse. When orders come in from commercial customers, the products are picked from the shelves and placed in corrugated cardboard trays. The trays are then covered in shrink-wrap plastic for shipping.

Project Costs

Capital Costs: *$11,000 for purchase of baler.*

Annual Operating Costs: *Minimal; materials are delivered to recyclers using existing trucks.*

Revenues & Savings: *$3,000 per year in revenue from sale of corrugated cardboard; $10,000 per year in savings in waste disposal costs.*

For local deliveries in the Edmonton area, the products are delivered in the shrink-wrapped trays. When deliveries are made, the drivers will bring empty trays and clean shrink wrap back from the customers to the distribution centre. The cardboard trays can normally be reused two or three times before they go into the cardboard recycling system.

Some of the corrugated cardboard boxes which arrive at the warehouse are reused to package out-of-town orders for shipping. Some clean shrink wrap which has been returned from commercial customers is reused as packing material for out-of-town orders. However, there are still excess amounts of both corrugated cardboard and plastic shrink wrap to be dealt with.

Corrugated cardboard boxes which are not reused are broken down and placed in large corrugated containers at the end of the aisles in the warehouse. When the recycling program began, the main aisle in the warehouse was widened from 2.4 metres to 3 metres to allow for easier movement and collection of the corrugated cardboard. When the large boxes are full, they are taken and emptied into the vertical baler.

Office paper is collected for recycling or shredded and reused as packing material.

Baled corrugated cardboard is taken to a local recycled paper broker using the Grand & Toy delivery trucks. Grand & Toy is still exploring a recycling market for excess plastic shrink wrap.

The baler for the corrugated cardboard cost $11,000 to install and a pay-back period of 10 years was originally estimated. Initially, low prices for recycled cardboard made the pay-back period look doubtful, but recent increases in recycled paper prices and savings in waste disposal have more than justified the baler. The program now recycles approximately 40 tonnes of corrugated cardboard per year and generates about $3,000 in revenue.

Grand & Toy has also taken other steps to reduce waste at their Edmonton Branch Distribution Centre. Office paper is collected in desk-side containers in each work area of the centre. The desk-side containers are emptied into 190-litre wheeled toter carts at four locations in the centre.

Confidential office paper is shredded and reused as packing material in the warehouse. The recycled office paper is taken to a recycling depot operated by the City of Edmonton.

Excess, damaged or out-of-date stock from the warehouse is often sold through an auction mart or donated to schools. However, in some cases, damaged stock must be disposed of. The warehouse manager would like to see more of his suppliers assume responsibility for taking back and recycling damaged and defective materials.

Grand & Toy also recycles wooden pallets which are received at the warehouse. About 60 wooden pallets per week are made available to a local freight company at no cost. Linen towels have replaced paper towels in the washrooms and the employees recycle beverage cans and bottles in the lunchroom.

In 1990, Grand & Toy's compactor waste bin was emptied on a daily basis. Now the bin is emptied only on demand, usually less than once per week. As a result of the waste reduction program, the company saves $10,000 per year on waste disposal costs.

Project Results

Grand & Toy recycles 40 tonnes per year of corrugated cardboard from its Edmonton Branch Distribution Centre.

Recycling Aluminum in a Manufacturing Plant

Aluminex, Edmonton

Project Summary

Business Background: The Edmonton shop of Aluminex custom cuts and assembles parts to build aluminum store fronts and window frames. The operation employs 6 full-time people within a 4,400-square metre shop in southeast Edmonton.

Project Description: Following initial encouragement by the City of Edmonton, the operation continues to segregate and recycle clean and dirty scrap aluminum, cardboard and office paper. Miscellaneous items in the coffee room are also reduced or eliminated.

Business Background

Aluminex is a 20-year old manufacturer of custom aluminum store fronts and window frames with its head office in Coquitlam, British Columbia. The Edmonton shop has been in operation for 11 years and has been in its current 4,400-square metre building for four years. This operation is primarily involved in the cutting and assembly of preformed parts for commercial store fronts and window frames.

Project History

In 1993, a representative of the City of Edmonton introduced Aluminex's shop supervisor to the City's business waste minimization program. The City offered the expertise to examine Aluminex's waste streams and offered landfill diversion options. Aluminex willingly agreed to participate in the program on the basis that proper handling of the wastes they generated was good business practice and made for improved environmental stewardship.

Initially, the City loaned Aluminex a number of trays for segregating office papers and a bin for collecting cardboard. The management of the program was taken on by the shop supervisor and secretary, although all the staff willingly accepted the idea. Following the trial period, Aluminex continues to implement the programs recommended by the City in spite of slightly increased waste management costs.

Project Description

Aluminex's waste management system involves a simple set up of four collection bins for clean aluminum, dirty aluminum, paper and cardboard and general waste. All bins are located inside the shop near the loading bay doors.

At the main saw bench, there are two bins for collecting aluminum. During cutting operations, clean aluminum scraps are placed in one bin. The other bin receives painted aluminum, aluminum shavings and floor sweepings which contain a high proportion of aluminum. The clean scrap bin is a 1-cubic metre corrugated cardboard gaylord. The dirty aluminum goes into a 2-cubic metre metal bin.

When these bins are full, they are picked up by the scrap dealer. Payment is sent to Aluminex after the aluminum has been weighed. This program generates a minimum of 150 kilograms of aluminum to be recycled every month and, depending on prices, about $150 of revenue. A key aspect of the aluminum recycling is the segregation of clean and dirty metal to ensure the best price is obtained for the clean product.

Corrugated cardboard is flattened and placed in a white, 2-cubic metre metal bin as parts arrive and are removed from their containers. Originally, a bin was loaned by the City for this purpose to test the program. Aluminex now rents the cardboard bin from their waste hauler for $11 per month. The bin is collected and taken to a recycler by the waste hauler on a monthly basis. This program

Project Costs

Capital Costs: *No additional capital costs to implement waste minimization program.*

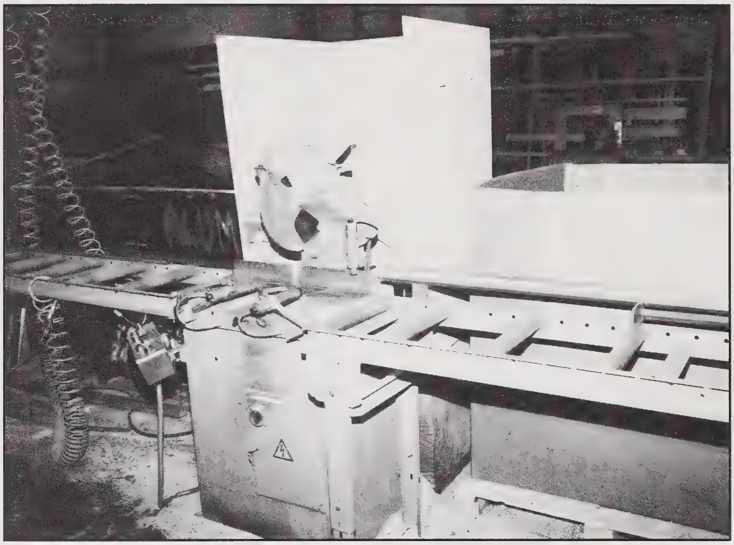
Annual Operating Costs: *Total waste disposal costs have increased from $900 per year without recycling to $1,332 per year including rental of a recycling bin.*

Revenues & Savings: *$1,800 per year in revenue from the sale of scrap aluminum.*

collects approximately 180 kilograms of corrugated cardboard per month.

The service of collecting and replacing the waste bin and the corrugated cardboard bin costs $100 per month, leading to a total waste and recycling cost of $111 per month including bin rental. Bin collection and rental costs were only $75 dollars per month before paper and cardboard were separated to facilitate recycling. The extra costs to facilitate recycling are not considered significant in the overall operation. The shop supervisor believes it is more important that any waste materials generated in their business are dealt with in the proper way. This feeling is shared by the staff who find the system no extra burden on their workload and readily cooperate to collect and segregate materials into the proper bins.

The waste management efforts of Aluminex are extended into the office and lunchroom areas. Office papers are collected in simple cardboard trays made from used containers to replace the original test trays provided by the City's pilot program. The office paper is added to the corrugated cardboard bin for recycling. Cans and bottles from the lunch room are collected for recycling and all disposable coffee cups have been replaced by a supply of washable mugs.



Two bins for collecting clean, and dirty or painted, aluminum are adjacent to the cutting table.

Project Results

Approximately 180 kilograms of corrugated cardboard and paper and 150 kilograms of aluminum are recycled each month. Managers and staff see benefits in knowing that waste materials are handled properly.

Recycling Plastic Milk Jugs

Holgerson Dairies Inc., Smoky Lake

Project Summary

Business Background: Holgerson Dairies Inc. operates a dairy in Smoky Lake with 45 employees. The dairy produces 175,000 litres of milk per week, as well as ice cream and other products.

Project Description: Holgerson Dairies produce their own plastic milk jugs on-site and recycle in-house plastic in the manufacturing of these jugs. The dairy also operates a separate post-consumer recycling program which accepts plastic jugs from their retailers and customers.

Business Background

Holgerson Dairies Inc. is a family-owned dairy in Smoky Lake with 45 employees. The dairy produces 175,000 litres of milk per week, as well as ice cream, yogurt, sour cream, cottage cheese and fruit drinks. The products, marketed under the Horizon Dairy Products brand name, are distributed throughout central and northern Alberta.

The dairy, which opened in 1988, grew out of the Holgerson family's dairy farm business. They are now the only independently-owned, full product line, dairy in Alberta. Holgerson Dairies Inc. was a founding member of the Alberta Plastics Recycling Association.

Project History

From the earliest planning stages in the late 1970s, the Holgersons considered using lightweight plastic jugs for their milk products. At the time, the Alberta dairy industry was almost entirely using cardboard containers and plastic pouches. Holgerson Dairies felt that the plastic jug was a preferable container because it cost less to produce, it could be filled more efficiently and it could be recycled. They also felt that a 4-litre container would further increase cost efficiency and would meet consumer demand.

When the dairy opened in 1988, the dairy industry and government regulators were sceptical about the plastic jug in general and the 4-litre jug in particular. Holgerson Dairies persevered and overcame several regulatory roadblocks to bring their product to market. While the dairy industry was sceptical, consumers were not. Consumers liked the recyclability of the plastic jug and the convenience of the 4-litre size. By 1994, 32% of the milk sold in Alberta by all dairies was sold in plastic 4-litre jugs.

Holgerson Dairies was the first dairy in Alberta to use plastic jugs exclusively and remains the only dairy in Alberta to manufacture their own plastic jugs on-site. Since 1988, Holgerson Dairies has also taken responsibility for its packaging and has provided an opportunity for the consumer to return the plastic jug for recycling.

Project Description

Holgerson Dairies produce their own plastic milk jugs on-site. The blow moulder used to produce the jugs has interchangeable moulds for 1-litre, 2-litre and 4-litre jugs. The machine can manufacture 900 2-litre jugs per hour.

All flashing, consisting of excess pieces of plastic on the jugs as they come out of the mould, is recovered, reground and fed back into the blow moulder. Defective jugs are also reground and fed back into the process. Under normal conditions, the blow moulder runs on 60% virgin plastic and 40% reground plastic. However, the machine can operate on 100% reground plastic if necessary. This reuse of in-house plastic scrap is standard practice in the plastic manufacturing industry.

After the plastic jugs are formed, they are packaged into cases with a protective top and bottom sheet of corrugated cardboard and wrapped in plastic film. They are then moved into a storage warehouse. The dairy keeps a four- to six-week supply of jugs in storage. This allows them to run a single size of container on the blow moulder for an extended period of time. This also provides a stock of containers should jug manufacturing be interrupted because of equipment maintenance.

When the plastic jugs are unpackaged for use, the protective corrugated cardboard sheets are kept for reuse and the plastic wrap goes into the dairy's post-consumer plastic recycling system.

Project Costs

Capital Costs: *$15,000 for vertical baler.*

Annual Operating Costs: *Minimal as collection and delivery system uses existing trucks and routes.*

Revenues & Savings: *Revenues from the post-consumer recycling program are minimal as Holgerson Dairies often accepts recycled plastic materials as payment from the recycling company.*

In addition to recycling in-house plastic scrap in its manufacturing of plastic jugs, Holgerson Dairies operates a separate post-consumer recycling program for plastic jugs returned by its customers and retailers. Customers can return their empty jugs to the retailer who places them in the same crates that are used to deliver milk to the store. Holgerson Dairies picks up the empties when they make their next delivery. Because the milk crates do not nest, returning empty jugs in the crates does not take up any additional room on the truck.

Not all of Holgerson Dairies's retailers participate in the recycling program. Some are concerned about the cost of handling the empty jugs and others are concerned about setting a precedent for the return of packaging to the retailer.

Holgerson Dairies also provides a drop-off for milk jugs at the dairy in Smoky Lake. Some milk jugs are also going into community recycling programs.

In promoting its program, Holgerson Dairies asks the consumer to rinse the bottle before returning it. To date, the quality of material returned has been excellent and contamination problems have been few.

Milk crates are put through washer after jugs returned for recycling are put in baler at rear.

When the returned empty jugs reach the dairy, they are immediately taken out of the crates and placed in a vertical hydraulic baler. The crates are then washed before they are reused to ship milk. The baled plastic jugs are delivered to a plastic recycler in Edmonton when the dairy's delivery trucks go there for servicing. This results in little additional cost for the delivery of the baled plastic.

The initial cost of the baler for the jugs was $15,000. Holgerson Dairies gets some revenue for the recycled plastic but sees the recycling program as good corporate citizenship rather than as a source of income. Holgerson Dairies has often accepted plastic lumber, posts and picnic tables made from recycled plastic as payment from the recycling company. They have used some of these materials within the dairy and have used others, such as picnic tables, as promotional items.

Holgerson Dairies receives about 10% of their milk jugs back through the recycling program. This amounts to approximately 22 tonnes of plastic jugs recycled each year.

Holgerson Dairies has been very active in making both their customers and retailers aware of the environmental advantages and recyclability of the plastic jug through press releases, brochures distributed with their products and information packages for retailers.

Holgerson Dairies has taken other steps to reduce wastes within their plant. Prior to 1991, their pasteurization system used pre-cooled town water as a coolant. After one use, the clean coolant water went to the town sewer. In 1991, a closed-circuit cooling system was installed on the pasteurization process. The coolant water is now refrigerated and continuously reused. This change has resulted in a savings of 7.2 million litres of water and approximately $2,000 in water costs per month.

Holgerson Dairies also saves the corrugated cardboard boxes that the caps for the milk jugs are received in and reuses them as shipping boxes for yogurt. They are also researching the use of plastic pallets and milk crates made from recycled plastic.

Project Results

Holgerson Dairies recycles approximately 22 tonnes of post-consumer plastic milk jugs each year.

Recycling Program for Retailers and Shoppers

Bower Place Shopping Centre, Red Deer

Project Summary

Business Background: Bower Place Shopping Centre is a 40,000 square metre mall on the south side of Red Deer. The mall has four major anchor tenants and 107 stores and services.

Project Description: Bower Place Shopping Centre operates a recycling program collecting corrugated cardboard and six other materials from its retailers. The Mall also operates a beverage container and newspaper recycling program for its shoppers.

Business Background

Bower Place Shopping Centre is a 40,000 square metre mall on the south side of Red Deer. The mall has four major anchor tenants and 107 stores and services. The mall is one of 45 shopping centres in Canada, including 8 in Alberta, managed by Cambridge Shopping Centres Ltd.

Project History

Early in 1994, Cambridge Shopping Centres Ltd. decided to take a leadership role in promoting waste reduction at its centres. A consultant was hired to advise Cambridge on waste reduction opportunities at all of its properties. Waste audits were conducted at several locations, including the Bower Place Shopping Centre. The consultant designed a waste reduction program for each shopping centre based on the waste audit and the available local recycling opportunities. The waste reduction program at Bower Place Shopping Centre was initiated on June 1, 1994.

Retailers' materials are collected at four locations, each with six 430-litre wheeled toter carts.

Project Costs

***Capital Costs:** $5,537 for signage, bins, toter carts and blue boxes and $855 for promotional materials.*

***Annual Operating Costs:** $2,400 per year.*

***Revenues & Savings:** No revenues are received for the recycled materials at this time. There are potential future savings in waste disposal costs.*

Project Description

The Bower Place Shopping Centre waste reduction program involves both retailers and shoppers. To serve retailers, Bower Place established four recycling depots in the service corridors of the mall. Each recycling depot consists of six 430-litre plastic, wheeled toter carts. The materials collected in the carts are white ledger paper, computer printout paper, newspaper and magazines, clear glass, coloured glass and cans. The four depot locations were selected to provide easy access for all retailers and to avoid blocking fire exit corridors.

At the start of the program, each retailer was provided with a 45-litre blue recycling box. When the blue box is full, the retailer takes the materials to the closest depot and sorts the materials into the toter carts. The toter carts are emptied regularly by Let's Recycle, a local recycling contractor.

To collect and recycle corrugated cardboard boxes, Bower Place established a 6-cubic metre bin in an outside service lane of the mall. Retailers break down their cardboard boxes and take the materials directly to the bin. The bin is serviced by the mall's waste collection contractor.

During a major renovation of the mall food court area in the spring of 1994, motion sensitive faucets and urinals were installed resulting in reduced water usage. Bower Place also provides for the collection of wooden pallets from the retailers and arranges for these to be reused or recycled.

To promote the recycling program, all retailers are provided with an information package discussing the benefits of waste reduction and recycling, describing the Bower Place recycling program and providing a map of the depot locations. Retailers also receive a plastic-laminated set of instructions for the recycling program which may be posted for their employees' information.

Bower Place Shopping Centre also provides recycling opportunities for its shoppers. Bins have been placed in the public areas of the mall for the recycling of newspapers and beverage cans and bottles. The food court area has three 360-litre bins and three 290-litre bins for cans and bottles and three 290-litre bins for newspapers. There are also 6 pairs of 290-litre bins for beverage containers and newspapers in other locations in the mall. All of the bins are lined with plastic garbage bags.

When the bins are full, the mall maintenance staff take the materials to the four depots used by the retailers and sort the materials into the appropriate toter carts. Although shoppers sometimes place garbage in the recycling bins, this contamination can be removed when the materials are sorted into the toter carts.

Several bins for collecting beverage containers and newspapers are located throughout the mall.

Bower Place Shopping Centre promoted the June 1st, 1994 kick-off of its recycling program through a press release, advertising and a "crushed can contest" where shoppers could guess at the number of crushed cans in a display. The winners of the crushed can contest received gift certificates for use at the mall. Tent cards promoting the program were displayed in stores and on tables in the food court area. The recycling program received some coverage on the local television station and was featured at a commercial waste minimization workshop sponsored by the City of Red Deer and Environment Canada.

The cost of initiating the recycling program at the mall was $3,060 for the consultant's study, $5,537 for signage, bins, toter carts and blue boxes and $855 for promotional materials. The cost of servicing the corrugated cardboard bin and the toter carts is $200 per month.

The quantities of materials recycled in the program are not monitored. However, the consultant's waste reduction study estimated a potential waste reduction of 55% or 209 tonnes of the mall's solid waste through the program.

Although there are costs to operate the program, Cambridge Shopping Centres Ltd. has undertaken the program because of the perceived benefits of conserving resources, energy and landfill space and enhancing public relations through leadership in waste reduction.

Project Results

A consultant's waste reduction study estimates a potential waste reduction of 55% or 209 tonnes of the mall's solid waste.

Recycling Wood Waste From Furniture Production

Palliser Furniture, Airdrie

Project Summary

Business Background: Palliser Furniture is a large, family-owned manufacturer of household furniture. The Airdrie operation specializes in motion furniture produced by a staff of 170.

Project Description: The operation collects scrap wood, corrugated cardboard and office paper for recycling. Miscellaneous items such as fabric scraps and empty fabric rolls are also collected and donated for reuse by non-profit organizations.

Business Background

Palliser Furniture is a family-owned business which, after 50 years of operation, has grown to be one of the largest furniture manufacturing firms in Canada. Palliser's Airdrie operation currently employs 170 people and specializes in household "motion" furniture such as reclining chairs and fold-away beds. The plant occupies two large buildings plus large outdoor yards in the East Lake Industrial Park in Airdrie, about 20 kilometres north of Calgary.

Project History

Palliser's purchasing manager became concerned about waste management in the early 1990s. At that time, an awareness of increasing disposal costs, and a concern for environmental responsibility and employee safety, resulted in a search for alternative materials and waste disposal methods. It was obvious that wood scrap from furniture frames and corrugated cardboard from supply shipments were the main components of the waste stream. Disposal was a significant cost to the operation since these wastes were hauled by a contractor to a landfill site near Calgary.

By researching opportunities in waste minimization and using the assistance of waste management consultants, Palliser has been able to minimize its waste handling costs and divert significant wastes from landfill. Over five years, corrugated cardboard handling has evolved from an initial basic compaction process to reduce the volume, to increasing the efficiency of the compactor, and eventually to making arrangements to recycle of all the cardboard. During this evolution, the business has cooperated with the City of Airdrie's recycling program and continues to value the

Bins of scrap wood are gathered at the rear of the plant and are emptied into an outdoor 30-cubic metre bin for recycling.

information and services offered by a waste management consulting firm.

Project Description

Large amounts of used corrugated cardboard and wood are generated at Palliser as furniture parts arrive from suppliers as far away as Kentucky and wood is cut to prepare furniture frames. It is estimated that the business generates about 37.5 cubic metres of uncompressed corrugated cardboard and 30 cubic metres of wood scrap each week.

Originally, all corrugated cardboard was compacted, along with other wastes from the manufacturing operation, and sent to the landfill for disposal. The cost of the compactor was $10,000. As the cost of disposing of these materials was becoming fairly expensive, alternative solutions were investigated. At the time, the City of Airdrie was establishing a small business and residential cardboard recycling program. Palliser entered into negotiations to have the city accept some of Palliser's cardboard into their recycling program for a fee. Since the city would accept loose cardboard, Palliser was able to reduce the operation of their compactor. The significantly shorter hauling distance for some of its cardboard was also a benefit to Palliser and as well as the avoided tipping costs at the Calgary landfill.

The city benefited from the increased volume of cardboard which helped to make their fledging residential collection program viable. Negotiations with the waste hauler resulted in a separate bin for cardboard in excess of the amount accepted by the city. This bin is removed on a weekly basis for recycling in Calgary at a reduced charge with landfill tipping fees also being avoided.

Project Costs

***Capital Costs:** Approximately $10,000 for cardboard compactor.*

***Annual Operating Costs:** $5,400 per year for bin rental and collection of wastes and recyclables.*

***Revenues & Savings:** $5,000 savings per year in reduced waste hauling costs and avoided tipping fees.*

With the cardboard recycling program operating, attention was turned to the large amounts of wood scrap generated during the preparation of wood parts for furniture frames. Since 1993, wood has been collected in small wooden bins at the sawing and assembly stations where the scraps are generated. These small collection bins are mounted on wheels and when full can be easily rolled to a central location near the rear doors of the plant. A fork lift operator checks for contamination and empties these smaller boxes into a 30-cubic metre bin located outside the rear of the plant. The large bin is hauled to a recycler in Calgary where the wood is processed into roofing products.

The large outdoor bin for wood scraps is fenced to prevent contamination from unauthorized dumping by the public. Employees have also been informed of the need to ensure that the wood scrap quality is protected from non-wood contamination. Nails, staples and other miscellaneous small metal parts used in the furniture manufacturing process do not have to be removed as these are dealt with at the recycling plant.

Palliser also generates wood waste in the form of used or broken pallets. When sufficient pallets are accumulated to fill a 14.6-metre (48-foot) trailer, the pallets are hauled by a company truck to a wood recycler in Calgary. Four or five trailers of pallets are recycled each year and, while no revenue is generated, tipping fees are avoided.

The most recent stage in the evolution of waste handling at Palliser has been to accept the services offered by a waste management consultant. While the service offered by the consultant was originally greeted with scepticism, it was agreed to accept one of three options offered. It was agreed that, if the consultant could reduce waste handling costs to the firm, the consultant could retain half of the savings for a period of two years.

By pooling the wastes of several clients and ensuring a large volume of business, the consultant was able to negotiate cheaper collection rates with the waste hauler. In addition, the collection of bins was switched from a schedule to an on-call basis to avoid paying for collection when bins were not full. The consultant also found that the compactor could be set to operate at significantly higher capacity to increase the amount of waste handled per load and thus reduce the number of loads which required collection.

With the exception of the maintenance staff, who flatten cardboard prior to loading into the compactor, the waste programs at Palliser require little extra employee effort. Employees have learned to avoid contaminating the various bins and the programs seem to be working well.

Other waste management programs at Palliser include placing bags at work stations to collect miscellaneous items such as cardboard upholstery cores, scrap upholstery and thread spools. These are retrieved by a Calgary group for distribution to non-profit groups such as day cares for use as craft items. Beverage bottles and cans are collected in cafeterias, where wet and dry wastes are also kept separate to benefit from lower tipping fees for segregated materials.

Prior to developing these waste minimization programs, Palliser was paying its waste contractor an average of $400 per month for hauling in addition to landfill tipping fees. Following the consultant's analysis and subsequent negotiations with the hauler, Palliser now pays a flat rate of $450 per month for hauling of all recyclable materials and waste to their respective destinations. Overall, Palliser expects that the cost savings through its waste reduction and recycling programs will be approximately $5,000 per year.

The purchasing manager is always looking for ways to improve the program. Recently, higher prices for corrugated cardboard have resulted a proposal from a different collection company which is offering to pay Palliser $10 per bin of flattened uncompressed cardboard.

Project Results

Approximately 6.5 cubic metres of wood scraps are diverted from landfill each day.

Comprehensive Recycling Program

Weyerhaeuser Canada Ltd., Grande Prairie

Project Summary

Business Background:
Weyerhaeuser Canada Ltd. operates a sawmill and bleached kraft pulp mill in Grande Prairie. The mill employs 770 company employees and 350 contractor employees.

Project Description:
A comprehensive recycling program collects 27 different materials.

Business Background

Weyerhaeuser Canada Ltd. operates a 300,000 tonne per year bleached kraft pulp mill and a 160 million board feet sawmill at its Grande Prairie location. Both mills are located approximately 15 kilometres south of the city of Grande Prairie. The mills employ approximately 770 company employees and 350 contractor employees.

Weyerhaeuser purchased the Grande Prairie mill from the previous operator in December, 1992. Weyerhaeuser also operates wood processing facilities in Drayton Valley, Edson, Grande Cache and Slave Lake in Alberta, and at several other locations in western Canada and the western U.S.A.

Project History

In May 1993, Weyerhaeuser's environmental personnel attended a two-day workshop to discuss the company's environmental goals. One goal, as stated in the company's environmental policy, is "to develop and implement procedures relating to waste minimization, emissions reduction, by-product recycling, and materials handling and disposal." The company is also supportive of the Federal Green Plan and Provincial Action On Waste goals of reducing solid wastes by 50% by the year 2000.

Yellow garbage cans are used for aerosol can collection.

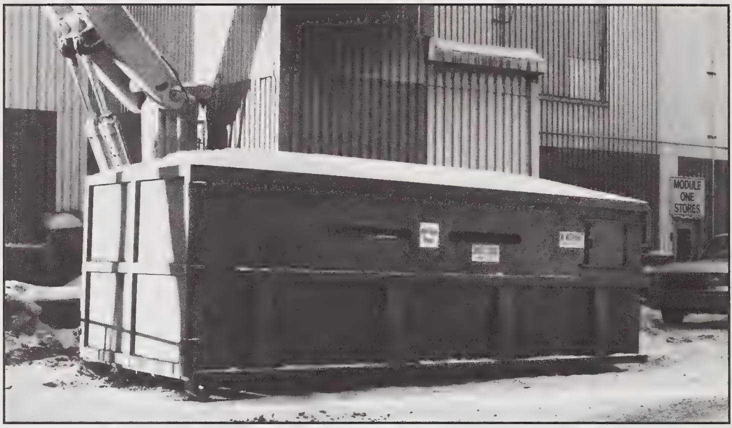
As a result of attending this environmental workshop, one company employee saw an opportunity to develop a comprehensive recycling program at the Grande Prairie location. While some materials were already being recycled, there was an opportunity to recycle several additional materials. Also, company employees were identifying additional materials which could be recycled and were eager to participate in such a program.

A proposal for a more comprehensive recycling program was prepared in June 1993 and received corporate approval to begin in September 1993. When the program began, seven materials were already being recycled. By the end of 1994, the recycling program had expanded to include 27 materials.

Much of the success of the program can be attributed to the structure for planning and managing the recycling program. A Recycling Leader acts as a resource person and coordinates site-wide budgeting and reporting for the program. Commodity Leaders for each of the 27 materials plan the collection of their material on site and work with suppliers and recycling companies to identify recycling opportunities for their

Materials Recycled

- 200-litre barrels
- Aerosol cans
- Automatic lubers
- Babbit (nickel/lead compound)
- Cable reels
- Computer disks
- Computers
- Corrugated cardboard
- Dry cell batteries
- Electric cable
- Flourescent lights
- Lead acid batteries
- Lumber wrap
- Mercury lights
- Metals
- Oil filters
- Padlocks
- Paint cans
- Pallets
- Paper
- Plastic oil pails
- Pop cans and bottles
- Safety glasses
- Tires
- Toner cartridges
- Used oil
- Waste & water treatment plastic pails



Corrugated cardboard is collected in 30-cubic metre bins at four locations around the mill.

material. Many of the materials added to the recycling program were the result of an employee with an interest in a particular material taking the initiative to identify a recycling opportunity.

Each work area at the site also has a representative who assists in the implementation of the recycling program in their particular area. The Recycling Leader, Commodity Leaders and work area representatives meet monthly to share information, solve problems and identify new recycling opportunities.

Project Description

Weyerhaeuser currently collects 27 different materials in their recycling program (see listing in side box). The recycling program has a very well developed collection system throughout the work site. The collection system for most materials is based on small collection containers or specific collection locations within the work areas. The collected materials are then moved to central locations for shipping. For example, aerosol cans are collected in yellow 145-litre garbage cans at approximately 17 locations around the mill. A contractor is responsible for emptying the collection containers and moving the cans to a central location at the mill's hazardous waste storage area.

Similarly, office papers, newspapers and magazines are collected in wheeled 175-litre bins at approximately 15 locations. The janitorial staff empty the bins into 30-cubic metre bins at four locations. For the collection of paper in individual offices, one work area is experimenting with desk-side recycling bins with a small detachable garbage bin.

Other materials such as metal, plastic pails and corrugated cardboard are gathered in a similar fashion in the work areas and delivered to central bins by the employees or contractors.

Some materials are returned to central supply points for recycling. For example, employees who are picking up new dry cell batteries, safety glasses or laser toner cartridges at central supply points return the used ones for recycling.

Once the materials have reached the central collection points, there are several mechanisms for shipping the materials to recyclers. For some materials, Weyerhaeuser has included recycling as part of the supplier's contract. For example, used oil, 200-litre drums and plastic pails are returned to the suppliers for recycling or reuse. For used lead acid batteries and tires which are returned for recycling, the suppliers provide credits toward the purchase of new items.

In one case, the supplier has taken their own initiative to implement waste reduction. The cafeteria contractor has switched from disposable to reusable cutlery and china, dispenses some condiments in bulk and provides a discount for filling a reusable coffee mug.

In other cases, the recycling program results in revenues or cost savings. Revenues are received for the sale of metals and electric cable to recyclers. Laser and fax toner cartridges are reconditioned and refilled for less than the cost of new cartridges. Used pallets and other surplus equipment are sold at a local auction mart.

For some materials, Weyerhaeuser pays to have specialized recycling contractors handle the material. Used oil filters are crushed on-site by a contractor using a mobile compaction unit. The drained oil is added to the Weyerhaeuser used oil tank and the filters are taken by the contractor for recycling. Similarly, Weyerhaeuser pays contractors to handle and recycle aerosol cans, dry cell batteries, fluorescent light tubes and mercury lights.

For other materials, Weyerhaeuser donates the materials to non-profit groups. In addition to providing their own bins for paper, corrugated cardboard and plastic wrap from lumber, Weyerhaeuser covers the cost of transporting these materials to Recycle Plus, a regional recycling program operated by the Grande Prairie and District Association for the Mentally Handicapped. Weyerhaeuser also does not accept any revenues for these materials.

The proceeds from the recycling of beverage containers are donated to local charities and used computer diskettes are donated to schools.

Weyerhaeuser has documented each of its recycling programs in Standard Operating Procedures. Each Standard Operating Procedure records the collection, storage, handling and shipping procedures, as well as the program costs and end use of each recycled material.

Project Costs

Capital Costs: *$60,000 for initial collection containers and bins.*

Annual Operating Costs: *$100,000 in 1994 plus employee time.*

Revenues & Savings: *$35,000 in revenues for recycled materials in 1994, plus $28,000 in avoided landfill operating and development costs.*

To promote recycling and to keep employees informed of changes to the program, recycling updates are included in the weekly employee newsletter. Weyerhaeuser has also produced a recycling video for both in-house training and public presentation.

While the comprehensive recycling program is the nucleus of Weyerhaeuser's waste management program, they have also implemented several waste reduction activities. Many materials in aerosol cans are being replaced with spray pumps or other alternatives. Paper towels have been replaced by cloth towels in the washrooms. The elimination of the plastic liner bags in the garbage cans is being tested. One area of the mill has provided their employees with reusable coffee mugs. The landscape contractor uses an informal composting program to dispose of grass clippings.

In addition, Weyerhaeuser has made several changes to their wood handling and processing systems to recover more wood fibre for use in the pulp mill or in the power boiler. Changes have also been made to improve the utilization and recovery of process chemicals.

Weyerhaeuser spent approximately $60,000 in capital costs for the initial purchase of recycling collection containers and bins in 1994. The company committed $100,000 per year for 1994 and 1995 to the operation of the recycling program including collection and transportation costs, contractor fees and the purchase of collection equipment. This amount does not include employee time to manage or participate in the recycling program.

In 1994, the company received approximately $35,000 in revenues for recycled materials and saved an additional $28,000 in landfill operating and development costs.

As a result of the waste reduction and recycling program, Weyerhaeuser reduced the quantity of waste hauled to the landfill by 27% or 317 tonnes in 1994. Major contributors to this reduction were over 260 tonnes of metal, 20 tonnes of corrugated cardboard, 10 tonnes of paper and eight tonnes of electric cable recycled. In addition, the program recycled 98,000 litres of oil, 4,460 fluorescent light tubes and over 3,000 aerosol cans in 1994.

A consultant's study of Weyerhaeuser's waste disposal bins in September 1994 found that, of the material being disposed, 18% by volume was potentially recyclable material and 32% by volume was potentially reducible material. Many of these materials have since been addressed and Weyerhaeuser continues to look for waste reduction opportunities. In mid-1995, the company expects to add hard plastics to its recycling system. These plastics will be delivered to the regional recycling program operated by Recycle Plus. Weyerhaeuser is also working to encourage more contractor participation in the recycling program.

Project Results

Weyerhauser reduced the quantity of wastes going to the landfill in 1994 by 27% or 317 tonnes, including 260 tonnes of metal, 20 tonnes of corrugated cardboard, eight tonnes of electric cable, 4,460 fluorescent light tubes and 3,128 aerosol cans.

Comprehensive Waste Minimization Program

Body Shop, Banff

Project Summary

Business Background: The Body Shop in Banff is a family-operated franchise of Body Shop International's skin and hair care products retail operations. The shop employs 2 full-time and 1 part-time employee in a small shop on a busy commercial street.

Project Description: The Body Shop has reduced product packaging and offers a refill option for many of its product containers. Corrugated cardboard, plastics, paper, glass and beverage containers are recycled.

Business Background

Body Shop International's skin and hair care products retail operation involves 1,043 stores world wide including 115 in Canada and 13 in Alberta. The Banff shop was established in 1990 and in August 1994 came under the management of the current franchise operators. It is located in a 70 square metre shop with a store front on the main commercial street of a busy resort town. Clientele include a large number of regional and international visitors in addition to local residents.

Project History

Since 1986, with the establishment of their Environmental Projects Department, Body Shop International has had a very proactive environmental policy. Their policy manual clearly expresses the desire to earn "Profits with Principles" and includes guidelines for corporate behaviour with regard to waste management.

At the retail outlet level, Body Shop believes they have a responsibility to not only address waste minimization in their own operations but to educate and motivate their customers to change their practices and to take environmental advocacy action in their own lives. The owners of the Banff franchise contribute to the local food bank from their store donations and are active in promoting environmental responsibility in the business community and schools. They have been very successful in reducing the amount of waste generated from their store and in finding an ongoing local solution to recycling plastics in a location where delivery of plastics to a recycler is difficult.

Project Description

At the Banff Body Shop, efforts to reduce packaging are an important part of their waste minimization program. Body Shop strives to use the minimum amount of packaging necessary to actually contain the product. Not only does this reduce packaging waste, but it also saves money spent on printing unnecessary merchandising packages. This simple packaging policy has also reduced the cost of losses when packaging is damaged in shipping and handling.

In customer service, there is a policy of asking all customers if they require a bag and offering some education on the waste issue, if necessary, to encourage people to avoid unnecessary bagging. Due to the tourism component of the clientele, a sign in the Japanese language has been posted at the cashier desk to assist in the education process. The bagging issue is supported by selling reusable cotton tote bags decorated with waste minimization messages.

The Banff store is decorated with a variety of environmental information posters and displays. An in-store educational centre, and occasionally store front displays, address a particular waste minimization or environmental issue. Customers may also pick up a variety of information brochures. A brochure discussing packaging offers information on waste reduction and recycling. Articles of clothing offered for sale also feature waste management messages. A toll-free information

The Body Shop offers both a refilling and recycling alternative for many of its product containers.

hot line is available for customers or local store operators who have questions about current policies or practices.

The Banff shop features a refill counter where customers may bring empty containers to be refilled. All customers leaving the store with new containers receive the message that they can return the container for refilling. Gift baskets bear a sticker with the same message. Forty-one products are refillable and the program includes both glass and plastic containers for products such as shampoos, skin lotions and perfumes.

The dominant wastes generated by the Banff shop are corrugated cardboard, plastic shrink wrap and empty plastic bottles. The cardboard and shrink wrap are received with product shipments. The cardboard is flattened with the use of utility knives purchased for the purpose and is placed in recycling bins provided in the rear alley by the Town of Banff. The plastic shrink wrap is stored for recycling. Plastic bottles are returned by customers and placed in a wooden drop box in the customer area beside the cash register. The box is painted in Body Shop colours and, while inviting customers to recycle, also points out the opportunity to refill the container.

With the exception of recycling days held twice each year and coordinated by the local recycling society, there is no ongoing opportunity to recycle plastics in Banff. In order to avoid storage problems, the Body Shop managers have established a cooperative program with Banff National Park which has no cost attached. When the Park is taking a load of plastics from their own operation to Calgary, they drop by the Body Shop and collect whatever plastic has been stored.

Three 55-litre blue recycling boxes, purchased for less than $50, are placed in the staff area of the store. These boxes are used to collect paper, beverage containers, glass and other recyclables. When one of these containers is full, the materials are taken to a community recycling depot as a staff member walks home.

There are a variety of other practices which reduce the amount of waste leaving the store. These include writing notes on cardboard shipping separators and saving packaging scraps and other materials for packing or building displays.

The shop surfaces are cleaned with old newspaper and a vinegar and water solution to eliminate chemical cleaners. Alternatives to strong chemical cleaners are used in other cleaning tasks. When needed, washable cloth rags are used instead of paper towels.

All of the waste minimization practices applied at the Banff store are integrated into the daily duties of the staff and require little additional time. Since many

Project Costs

Capital Costs: *Less than $100 in collection equipment.*

Annual Operating Costs: *No additional costs to implement the waste minimization program.*

Revenues & Savings: *No direct revenues or savings as waste collection costs are paid in municipal business taxes and no revenues are received for materials dropped at a community recycling depot.*

of the activities are reduction and reuse practices, the handling effort required for recycling has been mimimized. Staff are paid for 30 minutes at the end of each day to wrap up the day's business, including completing waste management tasks such as flattening cardboard.

The managers would like to find an effective solution to the problem of receiving unwashed bottles for refilling. Even though the bottles are being refilled and returned to the same customer, regulations require that they be clean and dry before refilling. While customer education continues, a bottle wash system is being considered.

With a minimum of expenditures at the store level, the Banff Body Shop has reduced its waste to small amounts of miscellaneous materials such as facial tissue and backing tape from product information stickers. The managers have a list of these miscellaneous materials for which options are being investigated. For example, the empty small plastic pots that contained face cream are collected from clients but cannot be included with the other recyclables. Some of these are cleaned and offered to the local day care for reuse as craft supplies.

Since waste collection is paid for in the business taxes and there is no revenue from the recyclables, there is no direct financial benefit to the Body Shop from their waste reduction efforts in Banff. However, the effort continues in the interest of being environmentally responsible. At present, 50 product refills are requested each month with the number increasing steadily since the refill option was first introduced. The plastics recycling program collects three 61-centimetre by 76-centimetre bags of small plastic bottles, one bag of plastic jugs and two to three bags of miscellaneous plastics dominated by shrink wrap every three months.

Project Results

The Banff Body Shop refills approximately 50 product containers per month. Three garbage bags of small plastic bottles, one bag of plastic jugs and two to three bags of miscellaneous plastics are collected for recycling every three months. An unspecified amount of corrugated cardboard is recycled through a town-operated program.

Comprehensive Waste Minimization Program

Colortron Photo Services Ltd., Edmonton

Project Summary

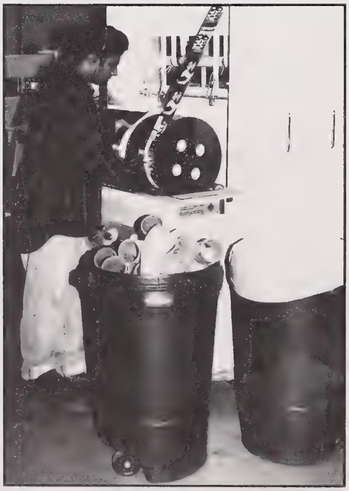
Business Background: Colortron Photo Services Ltd. in Edmonton employs 120 people and processes between 3,000 and 4,000 rolls of film each day in a 2,045-square metre facility.

Project Description: Colortron reuses or recycles most of the materials from the photofinishing business including film containers and canisters, single-use cameras, film leaders, hardboard film cores, office paper and corrugated cardboard. A unique chemical preparation and distribution system, as well as a silver recovery process, ensure that chemicals are used efficiently and wastes are minimized.

Business Background

Colortron Photo Services Ltd. in Edmonton is one of the largest and most modern photofinishing plants in western Canada. The Edmonton plant provides photofinishing services for large department stores, grocery stores, pharmacies and other businesses which do not have their own photofinishing facilities. The Edmonton facility employs 120 people and processes between 3,000 and 4,000 rolls of film each day. The 2,045-square metre facility includes an amateur film processing centre, a professional film processing centre and a merchandising division which provides photographic supplies to retailers.

Colortron operates photofinishing facilities in 10 locations in Canada, including Calgary and Edmonton. A move into a new building in 1992 resulted in a significant increase in space and an opportunity to upgrade much of the photofinishing equipment.



Hardboard paper cores are reused to rewind prints, returned to the paper supplier or given to the Imagination Market.

Project History

In 1991, the City of Edmonton conducted a waste audit and provided waste minimization suggestions to Colortron as part of the city's commercial waste minimization program. As a result of that assistance, Colortron began to recycle several materials from their operations. However, they found that they started off too quickly, attempting to recycle too many materials. It was difficult to implement collection systems, educate employees and find markets for several materials all at one time. The program coordinator found that they had to go back, simplify the systems and start over with some materials.

When Colortron moved into a new building in 1992, they had an opportunity to build recycling into their operations at the ground level. The design of the building and the purchase of new photoprocessing equipment provided some new opportunities for waste reduction. However, even in the new building, finding space for recycling collection containers and bins was difficult. Early in 1995, Colortron moved their merchandising department to another building which provided some addition space for accumulating recyclable materials.

Since beginning their recycling program in 1991, Colortron has dealt with several different recyclers for the various materials they collect. Early in 1995, they switched to a single recycling service contractor who would take all of their recycled materials at a lower cost than their previous contractors.

Project Description

Colortron has implemented waste reduction and recycling at most stages of its photofinishing process, from receiving incoming films to shipping the final product to its customers.

Films to be developed are placed in paper envelopes by the retailer and then shipped to Colortron in reusable nylon bags. The nylon bags are reused to ship the finished photographs back to the retailer. Any plastic film containers and lids which are received with the films are collected for recycling. Colortron will also accept containers and lids back from the retailers that it services.

At peak times, Colortron receives over 500 of the increasingly popular single-use cameras each day. At the plant, the films are removed from these cameras and the camera bodies are sorted by manufacturer. The camera bodies are returned to the manufacturers for dismantling, reuse of some components and recycling. One manufacturer provides 50-litre green plastic bins for collecting the cameras and pays 25 cents to a charity for every camera returned.

The canisters containing 35 mm film are opened in a dark room and the film removed. The film canisters, which are a combination of plastic and metal, are collected in plastic bags and sent to a recycler who is able to separate and recycle these materials.

The plastic cartridges from 110 and 126-size films are also gathered in plastic bags and shipped back to the film suppliers for recycling. The paper backing from these films, which has a carbon layer, cannot be recycled. These are sent to the Imagination Market in Edmonton, a store which specializes in creating craft supplies from reusable materials.

Most spent chemicals are processed through three silver recovery units.

After they are removed from the canisters, the films are spliced together to be fed through the developer. When the films are spliced together, the film leader is cut off of each film. These pieces are bagged and sent to a recycler who recovers the silver from the film and pays Colortron for these materials.

The print paper which is used in the photofinishing process arrives at Colortron wound on 10 centimetre diameter hardboard cores. These cores are reused to roll finished prints before they go to final cutting. Excess cores are returned to the paper supplier or are given to the Imagination Market.

Print paper is also received in brown kraft paper bags with a black plastic liner. The paper and plastic layers are sealed with adhesive at the ends of the bag. This makes it difficult to recycle the bags. Colortron cuts the adhesive ends off of the bags and separates the paper and plastic layers for recycling. This is labour intensive but Colortron has been able to use students and subsidized work programs to carry out this work.

Colortron has not been able to find a market for developed print paper from roll ends, spoiled photos and trimming in their professional developing section. Therefore, developed print paper is one of the few materials remaining in their waste stream.

Previously, developed prints were returned to the customer in a paper wallet with the negatives stored in a plastic sleeve. Colortron now uses a combination paper wallet containing both the prints and the negatives, eliminating the plastic sleeves. This also resulted in a savings of approximately 11 cents per plastic sleeve. If a protective sleeve is required for certain special order negatives, a recyclable paper sleeve is now used.

At the heart of Colortron's photofinishing process is a unique chemical preparation and distribution system which was designed when they moved into their new building in 1992.

Most of the concentrated chemicals used in the photofinishing process are received in 57-litre plastic drums. The empty plastic drums are sent to the recycler.

The concentrated chemicals are mixed with water to produce stock chemical solutions in three 450-litre mix tanks located in a central chemical preparation room. The operation usually prepares 9,000 to 14,000 litres of stock solutions per week. The prepared solutions are pumped from the mix tanks to a series of elevated 400-litre storage tanks. Initially, when pumping from the mix tanks to the storage tanks, Colortron found that 20 to 30 litres of solution remained in the mix tanks because the outlet from the mix tank was a few centimetres above the bottom of the tank. This problem was overcome by designing a tipping mechanism for the tanks which causes the solution to flow to the outlet side of the tank. Now, less than five litres of solution remain after pumping out a tank.

The elevated stock solution storage tanks are connected to the photoprocessing equipment throughout the plant by tubes running in raceways below the floor level. When the chemicals in a piece of equipment need regeneration, a small amount is drained out of the equipment and the fresh chemicals are gravity-fed into the equipment from the sub-floor tubes.

Chemicals which are drained from the equipment return to the chemical preparation room via a second set of tubes in the sub-floor raceways. Most of the spent chemicals return to one of two 450-litre tanks. These two tanks feed into three silver recovery units. Silver is recovered by a cathodic electrode process and is sold. The effluent from the silver recovery units then enters a filtration system which removes any remaining silver, mercury and other contaminants. The final effluent, which is sent to the sewer, typically contains less than one part per million of chemical contaminants.

Two of the photoprocessing solutions (RA-100 developer and C41 bleach) are returned to 1,350-litre and 675-litre plastic tanks respectively in the chemical preparation room. These solutions are regenerated by adding base concentrates and are returned to the elevated storage tanks for reuse.

Colortron also reuses or recycles most of the paper products received at the facility. Corrugated cardboard boxes are reused to ship merchandise to retailers. Any excess corrugated cardboard goes to a 6-cubic metre recycling bin. Most office papers are collected in 170-litre plastic bins lined with plastic bags. The plastic bags of office paper are placed in the same bin as the corrugated cardboard. By bagging the office paper, the recycler is able to separate the office paper from the corrugated cardboard at the recycling plant. The recycling service for both corrugated cardboard and office paper currently costs $135 per month.

Confidential office papers are collected in 175-litre wheeled toter bins and are picked up by a shredding service. This service costs $24 per month.

Many of Colortron's professional clients return shipping envelopes, hardboard photograph protectors and other materials to the plant for reuse.

Colortron was not able to provide accurate records of the quantities of all of the materials recycled from their operation. However, they are confident that they are achieving considerable savings in waste disposal costs as a result of their waste minimization efforts. Also, Colortron lets their customers know of their waste minimization efforts through store signs, through inserts returned with the finished prints and through an environmental message on their print wallet. All of these have proven to be very positive marketing tools.

Project Costs

Capital Costs: *Most of the capital costs for waste minimization were included as part of a plant up-grade in 1992.*

Annual Operating Costs: *Prior to February 1995, Colortron was paying $1,620 per year for corrugated cardboard and paper recycling, $288 per year for confidential paper shredding and unspecified amounts for recycling other materials. Early in 1995, Colortron switched to a single recycling contractor who would take all of their recycled materials at a lower cost than their previous contractors.*

Revenues & Savings: *Colortron receives unspecified revenues for silver from their recovery units and through the sale of film for silver recovery. They are achieving additional savings through reduction and reuse of materials and chemicals and through reduced waste disposal costs.*

Project Results

Colortron has not tracked the quantities of materials recycled from their operations. However, they are confident that they have made significant reductions in materials used and wastes.

Information Sources

Organizations

For information on business waste minimization, contact:
Action on Waste, Alberta
Environmental Protection
14th Floor, 10405 Jasper Avenue
Edmonton, Alberta T5J 3N4
(403) 427-5838 (Edmonton)
(403) 297-8255 (Calgary)
1-800-463-6326

For information on hazardous waste disposal, contact:
Industrial Wastes Branch, Alberta
Environmental Protection
5th Floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta T5K 2J6
(403) 427-5847

For information on waste management and waste handling companies in Alberta, contact:
Environmental Services
Association of Alberta
250, 10508 - 82 Avenue
Edmonton, Alberta T6E 2A4
(403) 439-6363
1-800-661-9278

For information on exchange opportunities for industrial wastes, contact:
Alberta Waste Materials Exchange
P.O. Box 8330
Edmonton, Alberta
T6H 5X2
(403) 450-5000
1-800-661-2000

For information on waste minimization and recycling in Alberta, contact:
Recycling Council of Alberta
Box 40552, Highfield P.O.
Calgary, Alberta T2G 5G8
(403) 287-1477

Publications

Action on Waste, Alberta Environmental Protection has produced a series of waste minimization manuals and information sheets for various industry sectors. Manuals and information sheets are currently available for the following industries:

- Construction and Demolition Industry
- Vehicle Maintenance and Repair Industry
- Offices and Institutions
- Food and Beverage Service Industry
- Printing and Publishing Industry
- Food Retail Industry
- Retail and Merchandising Industry
- Landscaping Services Industry
- Analytical Laboratories
- Photographers and Photofinishers

These reports and information on other industry sectors may be obtained from:

Action on Waste, Alberta
Environmental Protection
14th Floor, 10405 Jasper Avenue
Edmonton, Alberta T5J 3N4
(403) 427-5838 (Edmonton)
(403) 297-8255 (Calgary)
1-800-463-6326

The following publications contain additional information on waste auditing and waste minimization alternatives for businesses:

Industrial Waste Audit and Reduction Manual
Practical Guide for Sampling Wastes and Industrial Processes
both available from:
Ontario Waste Management
Corporation
2 Bloor Street West, 11th Floor
Toronto, Ontario M4W 3E2
(416) 923-2918

Business Recycling Manual available from:
INFORM, Inc.
381 Park Avenue South
New York, New York, USA 10016
(212) 689-4040

Profit from Pollution Prevention
available from:
The Pollution Probe Foundation
12 Madison Avenue
Toronto, Ontario M5R 2S1
(416) 926-1907

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